NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATIONS

Bid Opening 03-28-02

The following Specifications are supplementary to the 1997 Edition of the *Standard Specifications for Road and Bridge Construction* as they apply to this Contract.

104.02 SUBLETTING OF CONTRACT. **Page 26** **02-09-01 07-20-01**

Delete Section 104.02 in its entirety and replace with the following:

The Contractor shall not sublet, sell, transfer, assign, or dispose of any portion of the Contract or Contracts without written consent of the Engineer. The maximum percentage that can be sublet shall be 70%, of the Total Contract Amount, excluding any designated specialty items of work. The amount of any specialty items performed shall be deducted from the total original Contract Amount before computing the percentage of work sublet. Requests for permission to sublet shall be submitted to the District Engineer in whose District the Project is located. The request shall be in writing on Department forms accompanied by evidence showing that the organization performing the work is experienced and equipped for such work. Subcontract work shall not begin until the "Request to Sublet" is approved. The following items shall be submitted with the "Request to Sublet" prior to the start of work.

A The Request to Sublet must show the total price subcontracted. The items of work, and quantities of each item subcontracted shall be shown.

B. Partial items shall be explained in detail and show the amount of each contract item being subcontracted.

Upon request of Project Engineer/Manager the Contractor shall provide a copy of the subcontract agreement or lower tier subcontracts if not attached to the "Request to Sublet." The Engineer's consent shall in no way be construed to be an endorsement of the subcontractor or its ability to complete the work in a satisfactory manner.

The contractor shall assure that the Subcontractor has received the following provisions:

A. EEO Affirmative Action Requirements.

B. Labor Rates form U.S. Department of Labor.

C. Required Contractor Provisions all Federal Aid Construction Contracts (FHWA-1273) and any addendums attached thereto.

D. Other federal aid provisions such as Buy America clauses.

No Subcontracts, or transfer of Contract, shall relieve the Contractor of liability under the Contract Bonds.

105.03 COOPERATION WITH UTILITIES. **Page 36** **07-17-98**

Delete the first paragraph of Section 105.03 and insert the following:

The Contractor shall notify all utility companies, pipe line owners, or other parties affected, to have all necessary adjustments of public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

105.06 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT. **Page 38** **02-15-02 03-28-02**

Delete Section 105.06 in its entirety and insert the following:

A. Sufficient resources shall be employed for completing the work in the manner and time required by the Contract.

B. Any person employed by the Contractor or by any Subcontractor who is intemperate, prejudiced, abusive, or disorderly shall be discharged at the written request of the Engineer and shall not be employed again on the work without the Engineer's approval. Should the Contractor fail to discharge this person or persons, or fails to furnish sufficient personnel for the proper prosecution of the work, the work may be suspended by written notice until such orders are followed.

C. When the methods and equipment to be used are specified, other methods and equipment shall not be used without authorization of the Engineer. The request shall be in writing and shall include a full description of the methods and equipment proposed and an explanation of reasons for making the change. If approval is given, the Contractor shall be responsible for producing work in conformity with Contract requirements. If the Engineer determines that the work produced does not meet Contract requirements, the Contractor shall discontinue the substitute method or equipment and complete the remaining construction with the specified methods and equipment. Deficient work shall be removed and replaced or repaired to the specified quality, by and at the Contractor's expense. No change will be made in basis of payment for construction items involved, nor in Contract time as a result of authorizing a change in methods or equipment.

D. Welders on contracts concerning SECTION 616 STRUCTURAL STEEL 616 D. shall meet the criteria established in AASHTO/AWS D 1.5 Bridge Welding Code, except as noted.

Welders utilized in the completion of all NDDOT contracts other than those falling under SECTION 616 STRUCTURAL STEEL shall meet the criteria established in Chapter 4 Qualification, of the American Welding Society AWS D1.1:2000 Structural Welding Code – Steel or most current edition of such Code.

Contracts using Aluminum welding shall meet the criteria established in Chapter 4, Qualification of AWS D1.2 Structural Welding Code – Aluminum or the most current edition of such code.

Welders on all NDDOT contracts must be qualified and certified by established welding accredits as outlined in the Code and test results must be submitted to the Materials and Research Engineer two (2) weeks prior to the welder beginning work on the project. The test results must conform to one of the example forms as provided in AWS D1.1 and must include the welders name, social security number, date tested, certifiers name, certifiers title, firm name and test results. The cost of testing and certification shall be at the Contractor's expense.

Approval will be for one year from the date of qualification. Approval of the welder's certification may be requested for additional periods of one year, up to a maximum of 3 one-year extensions, if the welder has been actively engaged at welding in the required positions within the previous 6 months. The Department has the right to require a requalification test at any time.

106.11 QUALIFIED LABORATORIES AND TESTING PERSONNEL. Page 47 04-20-01

Add new Section 106.11:

For all projects on the National Highway System or the Interstate System, the Contractor, when required by contract, shall supply qualified testing equipment and qualified testing personnel. The qualified test equipment shall meet the requirements set forth in the NDDOT Qualified Laboratory Program. The qualified testing personnel shall meet the requirements of the NDDOT Transportation Technician Qualification Program (TTQP). This program is administered by the Materials and Research Division and the District Materials Coordinators. All testing performed by Contractor, private testing laboratories, or consultant technicians for acceptance purposes must meet these requirements.

107.10 INERT WASTE DISPOSAL. **Page 59 04-20-01**

Add new Section 107.10:

This work consists of the proper disposal of inert material waste on a project. Inert waste includes, but not limited too; Concrete, Steel, and Bituminous Pavements and Base.

For additional information reference the North Dakota Department of Health–Division of Waste Management's "GUIDELINE 22A–INERT WASTE DISPOSAL VARIANCE."

When inert material on a project is designated the property of the Contractor, and the Contractor chooses to waste the material, the material must be disposed in one of two ways:

A. Disposal of the material at an approved permanent waste management facility.

B. Waste may be disposed of without the use of a permanent waste management facility if an "INERT WASTE DISPOSAL VARIANCE APPLICATION," SFN 50278, is filed with, and approved by the North Dakota Department of Health–Division of Waste Management. For guidance in the filing of the application refer to the North Dakota Department of Health–Division of Waste Management's "GUIDELINE 22A-INERT WASTE DISPOSAL VARIANCE." Upon approval of the variance, the Contractor shall furnish the engineer with an approved copy before any material is disposed at the approved site.

Locations of permanent waste facilities, and a variance application and guideline can be obtained at the North Dakota Department of Health–Division of Waste Management, 701-328-5166.

108.04 DETERMINATION AND EXTENSION OF CONTRACT TIME. Page 62 07-21-00

Delete Section 108.04 H in its entirety and replace with the following:

H. **Conversion of Days.** When conversion of working days to calendar days or calendar days to working days is necessary, the factor for making such conversions shall be as follows; seven divided by the number of working days specified to be counted per week equals the conversion factor for converting working days to calendar days. The inverse of this formula shall be used when converting from calendar days to working days.

108.04 DETERMINATION AND EXTENSION OF CONTRACT TIME. Page 63 11-10-99 02-15-02

Delete the table Schedule of Liquidated Damages in Section 108.04 J. and insert the following:

Original Contract	**Amount Liquidated Damages**	
Over - To & Including	Calendar Day	Working Day
$ 0 - $ 50,000	$ 150	$ 200
50,000 - 100,000	325	350
100,000 - 250,000	460	525
250,000 - 500,000	600	725
500,000 - 1,000,000	700	925
1,000,000 - 2,000,000	825	1,150
2,000,000 - 3,000,000	925	1,350
3,000,000 - 5,000,000	1,050	1,525
5,000,000 - 7,500,000	1,175	1,700
7,500,000 - Up	1,300	1,850

109.01 MEASUREMENT OF QUANTITIES. Page 66 06-19-98

Delete Section 109.01 D. and insert the following:

D. In computing volumes of excavation, the average end area method, prizmoidal method, or other acceptable methods will be used.

109.01 MEASUREMENT OF QUANTITIES. Page 67 09-18-98 03-12-99

Delete the first paragraph of Section 109.01 H.5 and insert the following:

For all asphalts except Performance Graded (PG) asphalt, when both samples of bitumen fail to meet any of the governing Specifications except penetration and demulsibility, but the quality deviation is not serious enough to materially affect the work quality, payment for the bitumen will be reduced at a rate of 20% of the invoice price (FOB refinery) per gallon or per ton, for the quantity of bitumen represented by the failing sample. If more than one of the governing specifications fails to meet the specified requirements, the price adjustment will be based on the lowest pay factor determined.

109.01 MEASUREMENT OF QUANTITIES. **Page 68** **09-18-98**

Add the following to Section 109.01 H.:

9. The price adjustments for Performance Graded (PG) Asphalts that fail to meet Section 818.02 A.3. shall be as defined in the *NDDOT Procedure for Acceptance of Performance Graded Bituminous Material*. The *NDDOT Procedure for Acceptance of Performance Graded Bituminous Material* is on file at the Materials and Research laboratory.

151.02 ROLLERS. **Page 86** **11-16-01**

Add the following as Section 151.02.F**:**

F. **VIBRATORY SHEEP FOOT/PAD FOOT/EXTENDED PAD FOOT ROLLERS.** Vibratory sheep foot/pad foot/extended pad foot rollers shall be capable of developing centrifugal force of 50,000 lbs. or more, have a minimum operating weight of 23,000 lbs., and a minimum roller width of 6 feet.

151.07 SCALES. **Page 88** **02-18-00**

Replace the words “Department of Weights and Measures” in the first, second, third, and fourth paragraphs of Section 151.07 A. with the following:

“Weights and Measures Division of the Public Service Commission”.

151.07 SCALES. **Page 92** **04-23-99**

Delete the first sentence of Section 151.07 C.5.

151.08 MINING/BLENDING MACHINE. **Page 93** **11-16-01**

Add the following Section as Section 151.08, Mining/Blending Machine:

151.08 MINING/BLENDING MACHINE.

The mining/blending machine shall be a self-propelled machine designed to pulverize the existing asphalt layers to a specified maximum size. It shall be capable of uniformly blending the pulverized material with existing or added aggregate base material. The machine shall have a control system to automatically control the elevation of the cutting head and be heavy enough to mine and blend the material to the specified depth.

153.06 ROADBED PLANERS. **Page 101** **02-09-01**

Delete the first paragraph of Section 153.06 in its entirety and replace with the following:

The roadbed planer shall be constructed of steel and shall be mounted on tracks. The planner shall be heavy enough to trim the roadbed to the specified tolerance with a frame capable of maintaining the required crown under all operating conditions.

The planer shall be equipped with rotary cutting mechanisms capable of trimming the subgrade and base to the required lines and grades within the tolerances of section 302.04 G.2 Surface tolerance Type B. The equipment shall be capable of trimming in sufficient width in one pass to allow the placement of the 28 foot concrete slab.

201.02 CONSTRUCTION REQUIREMENTS. **Page 111** **03-20-98**

Delete the second paragraph in Section 201.02 B. and insert the following:

Trees located within the boundaries of the new grade shall be removed to a depth of 18 inches below the finished ground line or 3 feet below the final dirt grade, whichever is lower. Trees located outside the boundaries of the new grade shall be removed to a depth of 18 inches below the finished ground line. Existing stumps shall be removed to the same depth specified for tree removal.

201.03 METHOD OF MEASUREMENT. **Page 112** **03-20-98**

Delete Section 201.03 D.1 and insert the following:

1. The diameter of trees shall be measured at a height of 24 inches above the ground. Payment for Stump Removal shall only be made for removing existing stumps. Stumps shall be measured by the average diameter of the stump at ground level. Trees or stumps 8 inches or less in diameter are classified as brush.

202.01 DESCRIPTION. **Page 113** **04-20-01**

Add the following sentence to the first paragraph of Section 202.01:

Proper disposal of Inert waste is covered in Section 107.10.

203.02 CONSTRUCTION REQUIREMENTS. **Page 120** **08-21-98**
09-18-98

Delete the eighth paragraph in Section 203.02 E.2 in its entirety and insert the following:

After the Contractor has removed the minimum quantity of borrow estimated in the borrow option, the Contractor shall pay the landowner and any other parties with legal interest in the property 80% of the minimum payment within 30 days after the Department has made payment to the Contractor. The balance of the royalty payment shall be paid within 30 days after the Department supplies the Contractor with final quantities. Should the work be performed in more than one calendar year, payment for material removed from the optioned area during a calendar year shall become due on December 31 of that year. If a different payment arrangement is negotiated between the Contractor and the landowner, a copy of the agreement shall be filed with the Department.

203.03 METHOD OF MEASUREMENT. **Page 124** **02-19-99**

Delete Section 203.03 C. in its entirety and insert the following:

C. **Borrow.** Borrow will be measured and paid for by the Cubic Yard or Ton according to Section 109.01.

302.04 CONSTRUCTION REQUIREMENTS. **Page 145** **11-16-01**

Delete Section 302.04 G., Surface Tolerance, in its entirety and insert the following:

G. **Surface Tolerance.** The surface of the completed base shall be tightly bound, smooth, and uniform; and conform to the cross section and grade specified.

Surface tolerance Type A shall be used unless specified.

1. **Surface tolerance Type A.** The finished surface shall not vary from the prescribed cross section elevation by more than 0.08 feet. The longitudinal profile shall not vary by more than 0.08 feet from the grade line established by the Engineer.

2. **Surface Tolerance Type B.** Trimming equipment with automatic grade controls shall be used when surface tolerance Type B is specified. Motor graders may be used as trimming equipment. The auto-

matic grade controls shall adjust for the cross slope and longitudinal profile. The automatic controls shall produce a finished surface that does not vary from the prescribed cross section elevation by more than 0.04 feet from the grade line established by the Engineer.

3. **Surface Tolerance Type C.** Trimming equipment with automatic grade controls shall be used when surface tolerance Type C is specified. The automatic grade controls shall adjust for the cross slope and longitudinal profile. Motor graders shall not be used as trimming equipment. Roadbed planers shall be used as trimming equipment as specified in section 153.06. Grade control shall be taken from a taut string line erected parallel to the grade line established by the Engineer, except the Engineer may permit a base or surface course to be used as a grade reference for trimming the shoulders. The taut string lines shall be erected and maintained so the automatic controls produce a finished surface that does not vary from the prescribed cross section elevation by more than 0.04 feet from the grade line established by the Engineer.

304.02 MATERIALS. **Page 146** **11-10-99**

Delete the first and second sentence of the second paragraph of Section 304.02 A. and insert the following:

Each lot of aggregate will be sampled by the Contractor, under the observation of and at random locations determined by the Engineer.

Delete the first sentence of the third paragraph of Section 304.02 A. and insert the following:

Three random samples for each lot, will be obtained by the Contractor, under the observation of and at a location determined by the Engineer.

304.04 CONSTRUCTION REQUIREMENTS. **Page 148** **11-10-99**

Add the following to the first paragraph in Section 304.04 A.5:

The mechanical spreader shall utilize automatic controls with a stringline to control the longitudinal profile.

304.04 CONSTRUCTION REQUIREMENTS. **Page 149** **03-12-99**

Delete the last sentence in the third paragraph of Section 304.04 A.6 and insert the following:

If deficient by less than one inch in thickness, price adjustments will be made to the Contract Unit Price for each lot of 4,500 square yards as provided in the following table:

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306 BLENDED BASE COURSE. **Page 150** **11-16-01**

Add the following Section as Section 306, Blended Base Course:

306.01 DESCRIPTION.

This work consists of blending and placing the existing aggregate base, existing bituminous surfacing and possibly one or more courses of aggregate into a uniform base material.

306.02 MATERIALS.

A. **Blended Material.** The blended material shall have 97 to 100% passing a 2-inch sieve and 90 to 100 percent passing a 1 1/2 inch sieve.

B. **Aggregate.** The aggregate shall meet Section 816 for a Cl. 3M aggregate.

C. **Acceptance.**

1. **Aggregate.** The Cl. 3M aggregate or the aggregate specified to blend with the existing material, will be accepted in lots. A lot is defined as one day's production if production is greater than 1,000 tons per day.

If production is less than 1,000 tons per day, then a lot is as many days' production as necessary to reach 1,000 tons. If plan quantity is less than 1,000 tons, a lot shall be equal to plan quantity. A day's production will not be split into more than one lot.

Three random samples will be taken for each lot of material placed. The sample shall be obtained from the equalized aggregate windrow prior to the blending operation according to the procedures outlined in NDDOT's *Field Sampling and Testing Manual*. The samples will be tested and the material accepted if the average of the 3 samples meets the gradation specified. If the material from all 3 samples meets the gradation specified, only one of the 3 samples will be tested from each subsequent lot. If the sample tested does not meet the gradation requirements, the remaining 2 samples will be tested. The average gradation of the 3 samples will be used to determine acceptance of the material. The testing of 3 samples per lot will continue until all 3 samples meet the gradation specified then only one of the 3 samples will be tested from each subsequent lot. When the aggregate does not meet the gradation specified, a reduction in the Contract Unit Price will be made. If the aggregate fails to meet the specified gradation on one or more sieves, the reduction will be the sum of the deductions as calculated below.

Unit Price Reduction: Percent of Deduction = 5 $\times$ percent of deviation from range limits.

If material is produced that deviates from the specified gradation for 2 consecutive lots incorporation of additional material into the work will not be allowed until the Contractor takes the necessary corrective action to meet the specifications.

The physical properties of the aggregate will be determined from three random samples from the stockpile from each lot of 10,000 tons or fraction thereof. If a fraction of a lot is less than 2,500 tons, it will be included with the previous lot of 10,000 tons. If the material from all three samples is within the specified limits, only one of the three samples will be tested from each subsequent lot. If at anytime the sample tested fails to meet the specified limits, the remaining 2 samples will be tested and the physical properties of each lot will be determined by the average of these 3 test results. The testing of three samples per lot will continue until all three samples are within the specified limits then only one of the three samples will be tested from each subsequent lot. If the average exceeds the specified limits for shale, the unit price for aggregate will be adjusted according to Section 302.06. If the average exceeds the specified limits for plasticity index or fractured faces, the Contractor shall correct the stockpile so the material meets specifications.

The L.A. Abrasion loss percentage will be determined on the basis of one composite aggregate sample taken and tested during the beginning of the aggregate stockpiling. If the aggregate source has been tested previously by the Department and the material is within the allowable limits, the tests for the L.A. Abrasion loss percentage will not be required.

2. **Blended Material.** When the blending process begins, the blended material shall be sampled and tested a minimum of two times per day to assure 97 to 100 percent of the material passes a 2–inch sieve and 90 to 100 percent passes a 1 1/2-inch sieve. When the Engineer is satisfied the Contractor is producing blended material within the specified limits, random tests will be taken as determined by the Engineer to assure compliance.

306.03 EQUIPMENT.

Equipment shall meet the following:

Item	Section
General	151.01
Water-Hauling Equipment	151.03 A
Material-Hauling Equipment	151.03 B
Tow-Type Pneumatic-Tired Rollers	151.02 A
Self-Propelled Pneumatic-Tired Rollers	151.02 B
Vibratory Sheep foot/pad foot/Extended pad foot Rollers	151.02 F
Mining/Blending Machine	151.08

306.04 CONSTRUCTION REQUIREMENTS.

A. **Pit Operations.** Stripping of the pit and pit operations shall be according to Section 106.02 and other Contract requirements to produce an aggregate meeting the specification for the class specified.

B. **Adding Corrective Material.** When a combination of materials is required to produce the class of aggregate specified, the aggregate may be blended at the pit or on the road to produce the specified material.

C. **Aggregate Placement and Blending.** When “Blended Base Course” is specified, the aggregate supplied to be blended with the existing material will be placed and compacted on the roadway to plan cross slope and to a longitudinal profile approved by the engineer prior to blending. It is intended for the contractor to use mining/blending equipment that rides on the existing surface. If the Contractor elects to use equipment that rides on the subgrade, the Contractor shall assure the equipment has sufficient weight distribution to prevent rutting or displacement of the subgrade below the blended material. Any damage caused by the contractor’s equipment riding on the subgrade shall be repaired at the Contractor’s expense.

When “Remove and Relay Blended Base Course” is specified, the Contractor may elect to blend the material on or off the roadway. The use of a Motor Grader to blend the material will not be permitted. The Contractor must prove to the Engineer that the process used to blend the material will provided a uniformly blended base course.

D. **Blending Depth.** The existing asphalt pavement depth varies. The pavement depths shown in the plans are from cores taken at specified locations. Primed aggregate and bituminous treated base (if present) are not included in the pavement depth. The actual pavement depths at other locations may vary. The Contractor is responsible for interpreting the pavement depths and including all costs in the bid price to process the required depth of existing pavement and existing aggregate.

When “Blended Base Course” is specified, the Contractor shall blend to: the depth shown in the plans or, if the depth shown in the plans is not great enough to process all of the existing surfacing, bituminous treated base (where present), and the existing base, the blending depth shall be increased to the lesser of the following depths:

1. A depth great enough to process all of the supplemental aggregate, existing surfacing and bituminous treated base (where present).
2. A minimum of 18”, measured from top of supplemental compacted aggregate. The distance between the exiting asphalt material not mined and the new pavement (asphalt or concrete) shall be a minimum of 18”.

During the blending operation the Contractor shall physically dig down, approximately every five hundred feet (each pass), to check the blending depth and visually verify the full depth of bituminous pavement has been blended without contamination from the subgrade.

When “Remove and Relay Blended Base Course” is specified, and if the Contractor elects to blend the material off the roadway, the entire depth of asphalt pavement shall be removed and blended with the aggregate specified.

E. **Placement and Compaction of Blended Material.** After blending, the Contractor shall place the blended material as shown in the Plans. The blended material shall be uniform in gradation and compacted to produce a uniform density throughout the entire section. If the material is deficient in moisture content, it shall be moistened to the degree necessary to attain compaction.

Compaction shall be carried out simultaneously with lay down operations. The vibratory sheep foot/pad foot/extended pad foot roller shall be used to obtain compaction until the feet/pads ride up close to the surface of the blended base. After this, the road top shall be compacted with a pneumatic roller until the surface is tightly bound and shows no sign of rutting or displacement under the compaction operations or traffic. Vibratory sheep foot/pad foot/extended pad foot and pneumatic tired rollers of the type specified in Section 151 shall be used.

F. **Soft Areas**. Unstable areas, as determined by the Engineer, that appear after the blended base has been compacted shall be repaired by the Contractor. If the unstable areas are due to poor compaction of the blended base, the Contractor will rework the blended base to obtain adequate compaction. The cost of reworking the blended base will be included in the item ”Blended Base Course.”

If the unstable areas are due to the subgrade, the Engineer may direct manipulation and drying of the subgrade. Payment for this work will be in accordance with Section 104.03 of the Standard Specifications.

G. **Application of Water.** Water shall be applied according to Section 216 as needed to secure required results.

H. **Surface Tolerance.** The surface of the completed base shall be tightly bound, smooth, uniform, and conform to the cross section and grade specified. The surface shall be finished using a Surface tolerance Type B as specified in Section 302.04 G.

I. **Limitations.** The quantity of aggregate or blended material permitted in windrows on roadways open to traffic, shall not exceed 3 miles. The aggregate or blended material shall be layed within 72 hours after being placed in the windrow.

Aggregate or blended material shall not be placed on a frozen subgrade.

J. **Maintenance of Completed Courses.** When the Contract includes successive base courses or base and surface courses, each course shall be maintained in a smooth and compacted condition until the succeeding course is placed.

306.05 METHOD OF MEASUREMENT.

A. **Blended Base Course**. Measurement and payment of the bid item "Blended Base Course" will be by the Square Yard based on the width of the existing asphalt pavement from the outside edge of the slough to the outside edge of the slough.

B. **Remove and Relay Blended Base Course.** Measurement and payment of the bid item "Remove and Relay Blended Base Course" will be by the Ton or Square Yard. When paid by the Square Yard the quantity will be determined by the width of the existing asphalt pavement from the outside edge of the slough to the outside edge of the slough.

C. **Aggregate**. Measurement will be by the Ton or Cubic Yard, as specified.

D. **Water**. Measurement will be made according to Section 216.

306.06 BASIS OF PAYMENT.

Payment will be made at the contract Unit Price for the following:

Pay Item	**Pay Unit**
Aggregate	Ton or Cubic Yard
Water	M. Gallons
Blended Base Course	Square Yard
Remove and Relay Blended Base Course	Square Yard or Ton

This payment will be full compensation all labor, equipment, and materials necessary to complete the work as required.

When the average of the test results specified in Section 306.02, shows a larger percentage of shale than the maximum allowable specified, a 1% reduction in the unit price will be made for each 0.2% above the allowable percentage. If the percentage of shale exceeds the allowable limit by 3% or more, the material will be rejected unless the material is accepted under Section 105.07.

When a mixture is subject to pay reduction as described in Sections 306.02 and 306.06, the Bid Price will be reduced by the sum of the price adjustments.

407.02 MATERIALS. **Page 169** **09-17-99**
03-28-02

Delete the second sentence of Section 407.02 A. and insert the following:

Bitumen will be accepted as outlined in the Combined State Binder Group agreement for North Dakota. Samples will be obtained by the Contractor under the observation of the Engineer, and immediately handed over to the Engineer for shipping and testing.

407.04 CONSTRUCTION REQUIREMENTS. **Page 174** **09-18-98**

Change the specification designation in the first paragraph of Section 407.04 K.3., from 408.05 C.3.a. to 408.05 C.

408.02 MATERIALS. **Page 179** **09-17-99**

Delete the second sentence of Section 408.02 A. and insert the following:

Bitumen will be accepted as outlined in the Combined State Binder Group agreement for North Dakota. Samples will be obtained by the Contractor under the observation of the Engineer, and immediately handed over to the Engineer for shipping and testing.

408.04 CONSTRUCTION REQUIREMENTS. **Page 180** **02-18-00**

Delete the second and third paragraphs in Section 408.04 B. and insert the following:

After 10,000 tons of aggregate is produced, the Contractor shall provide the Engineer with an aggregate sample representing each stockpile for a mix design. A sample tag identifying the project number, pit location, and class of aggregate shall be attached to the sample. The total weight of the combined sample will be about 150 pounds. The Contractor shall also submit in writing the average gradation of each stockpile and the proposed percentage of each stockpile to be used.

If the aggregate blend provided fails to produce the mix design properties recommended in the Field Sampling and Testing Manual, the Engineer and the Contractor will determine if adjustments in aggregate production are necessary to obtain the recommended properties. If it becomes necessary to adjust the aggregate production operation to produce an aggregate that will meet the mix design properties, the Department may negotiate an equitable adjustment with the Contractor. If the Contractor fails to provide a sample representing each stockpile after 10,000 ton of material is produced and the aggregate provided does not produce the desired mix design properties, the Contractor shall be responsible for providing a bituminous mix that meets the mix design properties stated in the Field Sampling and Testing Manual. (This mix must be approved by the NDDOT before production begins.)

The Department will develop a mix design according to the Department's Field Sampling and Testing Manual. The target value for each sieve for the mix design shall be the average of production samples multiplied by the percentage of material used in the blend proportion. NDDOT will blend the aggregate at the blend proportions specified by the contractor. The blended sample will be used for the mix design if the gradations obtained from the blended sample are within the tolerances listed in Table A when compared to the target values determined previously. If the aggregate is not within tolerance a mix design will not be developed. Mix production will not begin until a mix design is developed.

TABLE A
ACCEPTABLE TOLERANCES

5/8" – #4 sieve	± 5%
#30 sieve	± 3%
#200 sieve	± 1.5%
Plastic Index	± 2%

408.04 CONSTRUCTION REQUIREMENTS. **Page 182** **02-19-99**
02-09-01

Add the following paragraph after the eighth paragraph in Section 408.04 H.:

Rumble strips shall be milled into asphalt shoulders and be placed in a continuous pattern. Rumble strips will be discontinued across the full width of all public and private (residential and commercial) road approaches, entrance and exit ramps, and within designated city or urban limits. Rumble strips will not be installed on shoulders less than 4 feet in width.

408.04 CONSTRUCTION REQUIREMENTS. **Page 183** **04-17-98**
05-15-98

Delete the third paragraph in Section 408.04 I.2 and insert the following:

When specified density on mainline is required, the laboratory testing requirements in Section 408.05 C.1 will apply for shoulders, driveways, and section line approaches. The Contractor coring and compaction payment schedule in Section 408.05 C.2 and 408.05 C.3 will not apply.

408.04 CONSTRUCTION REQUIREMENTS. **Page 183** **02-18-00**

Add the following sentence to the end of the sixth paragraph of sections 408.04 I.2:

The Engineer has the option to remove the pneumatic-tired roller if compaction can be achieved without, and there is a problem with the tires picking up or with roller marks in the mat.

408.04 CONSTRUCTION REQUIREMENTS. **Page 184** **09-17-99**

Delete the third paragraph of Section 408.04 I.3.

408.05 ACCEPTANCE. **Page 185** **02-18-00**
11-16-01

Delete the fourth paragraph of section 408.05 A. 1. and insert the following:

If any two consecutive tests vary from the JMF gradation target value set for each sieve by more than the tolerances listed below, the pay factor for the full days production will be the lowest pay factor determined from the following formula:

408.05 ACCEPTANCE. **Page 189** **05-15-98**

Delete the third paragraph in Section 408.05 C.2.

408.05 ACCEPTANCE. **Page 190** **09-17-99**

Delete Section 408.05 C.3.b. (Control Strip).

408.06 METHOD OF MEASUREMENT. **Page 192** **09-17-99**

Delete Section 408.06 D. (Control Strip).

408.07 BASIS OF PAYMENT. **Page 192** **09-17-99**

Delete the Pay Item “Control Strip” from Section 408.07.

408.07 BASIS OF PAYMENT. **Page 193** **02-19-99**

Delete Section 408.07 B. in its entirety and insert the following:

When the average of the test results specified in Section 408.05 A.2 shows a larger shale content than the maximum allowable specified, the following deduction from the Bid Price for the bituminous mixture item will be made:

One percent reduction in unit price for each 0.2% above the maximum allowable percentage. If the percentage of shale exceeds the allowable limits by 2% or more, the material will be rejected unless the Construction Engineer elects to accept it under Section 105.07.

This reduction will apply to lots of 10,000 tons, and will be applied independently of Section 408.05 A.1.

410.03 CONSTRUCTION REQUIREMENTS. **Page 194** **11-16-01**

Add the following paragraph to Section 410.03:

The Contractor shall place the pavement overlay within 5 calendar days of milling the pavement surface. If the milled surface is not overlayed within the 5 calendar days, the Contractor will be responsible to repair any breakups, or damage that occurred to the roadway after it was milled. The materials and methods used to make the repairs shall be approved by the Engineer. The cost of such repairs will be the responsibility of the Contractor and will be incidental to other items.

420.02 MATERIALS. **Page 195** **04-23-99**

Add the following to the end of the paragraph in Section 420.02 A.:

The Field Engineer will determine the actual amount of bitumen to be used based on the chip size.

420.02 MATERIALS. **Page 195** **09-17-99**
11-10-99

Delete the second sentence of the second paragraph of Section 420.02 A. and insert the following:

The bitumen will be conditionally accepted to the Project and sampled by the Contractor, according to Department's procedures and under observation of the Engineer.

Delete the second sentence of Section 420.02 B. and Section 420.02 C.

420.02 MATERIALS. **Page 195** **04-23-99**

Delete the last sentence of Section 420.02 B. and insert the following paragraphs:

A lot is defined as 1,200 tons of material. If plan quantity is less than 1,200 tons, a lot will be equal to plan quantity. If the final lot is less than 600 tons, it will be included in the previous lot, if the final lot is 600 tons or greater it will be a separate lot.

Three random samples will be taken for each lot of material. These samples will be tested and the material accepted if the average of the three samples meets the gradation specified. When the average of the three samples does not meet the gradation specified, a reduction in the Contract Unit Price will be made. If the aggregate fails to meet the specified gradation on one or more sieves, the reduction will be the sum of the deductions. The Unit Price Adjustment will be as calculated below.

Unit Price Reduction: Percent of Deduction = 5 $\times$ percent of deviation from range limits.

If the tested material deviates from the specified gradation for two consecutive lots, incorporation of additional material into the work will not be allowed until the Contractor takes the necessary corrective action to meet the specifications.

550.02 MATERIALS. **Page 205** **11-21-97**
02-20-98

Delete Section 550.02 B. in its entirety and insert the following:

B. **Portland Cement Concrete.** Class AE Portland Cement Concrete pavement shall consist of virgin coarse aggregate, virgin fine aggregate, water, an air entrained agent, and Type I, IA, or II Portland Cement.

Material shall meet the requirements of Section 802.

550.02 MATERIALS. **Page 205** **09-17-99**

Add the following item to the materials list in Section 550.02 C.2:

Backer Rod	826.02 B1

550.04 CONSTRUCTION REQUIREMENTS. **Page 207** **02-19-99**
05-18-01

Delete the first sentence of the sixth paragraph of Section 550.04 G.1. and insert the following:

Continuous rumble strips shall be milled in both paved concrete shoulders as shown in Standard Drawing.

550.04 CONSTRUCTION REQUIREMENTS. **Page 208** **02-18-00**

Delete the second and third paragraphs of Section 550.04 H. and insert the following:

The reinforcement shall be positioned on approved supports in advance of the concrete placement or inserted in the plastic concrete by an approved mechanical device.

The Contractor shall verify the placement of reinforcement in the plastic concrete pavement. At minimum, the reinforcement location will be verified at the start of paving each day and at a frequency of every 500 feet during normal paving.

On projects with over 20,000 SY of concrete paving, the location of the reinforcement shall be verified by the use of a micro covermeter. The Contractor shall provide the micro covermeter and, at the request of the Engineer, allow the Department personnel to confirm bar locations with the micro covermeter.

The vertical and horizontal location of the reinforcement in the concrete shall be shown in the plans. If the reinforcement does not meet the requirements and tolerances specified for the placement of the reinforcement, corrective action shall be taken immediately and performed at the contractors expense.

550.04 CONSTRUCTION REQUIREMENTS. **Page 208** **07-16-99**

Delete the first sentence of 550.04 I.2. and insert the following:

The contraction joints shall consist of weakened planes created by sawing on main line and shoulders, and by either sawing, inserting preformed inserts, or forming grooves in the pavement surface on small areas or tapers.

550.04 CONSTRUCTION REQUIREMENTS. **Page 210** **03-12-99**

Add the following sentence to the end of the fifth paragraph of Section 550.04 I.2.:

After the dowel bar assembly is staked to the roadbed and the dowel bars are held firmly in place, the assembly ties running parallel to the dowel bars shall be removed to allow for free movement of the dowel bars.

550.04 CONSTRUCTION REQUIREMENTS. **Page 210** **03-12-99**

Delete the last sentence of the sixth paragraph in Section 550.04 I.2. and insert the following:

The release agent shall be applied to the entire length of the dowel bars within two hours of being covered with concrete.

550.04 CONSTRUCTION REQUIREMENTS. **Page 211** **11-10-99**

Delete the last sentence of the first paragraph of Section 550.04 I.4 and insert the following:

Transverse construction joints shall be installed halfway between two normally spaced transverse joints.

550.04 CONSTRUCTION REQUIREMENTS. **Page 213** **11-20-98**
03-28-02

Delete the fifth sentence in Section 550.04 J.5. in its entirety and insert the following:

Hand floats shall be operated across the pavement by starting at the edge and slowly moving to the crown and back again to the edge.

Delete Section 550.04 J.6. in its entirety and insert the following:

Final Surface Finish. After surface irregularities have been removed and before the concrete attains an initial set, a seamless strip of stiff-fiber artificial grass carpet shall be dragged longitudinally along the full width of the pavement. The surface texture shall be uniformly roughened leaving corrugations in the surface that are uniform in appearance. The width of material in the drag shall be in contact with the full width of the pavement. The drag shall be operated off of a string-line with its leading edge attached to a bridge riding on the forms or adjacent slabs. The drag shall be maintained clean and free from encrusted mortar. A drag that can not be cleaned shall be replaced with new fabric.

Immediately following the grass carpet drag, the surface shall be given a transverse metal tine finish. The tining device shall consist of a single row of tines capable of producing grooves at groove widths with the following spacing (in inches): 2 1/4, 2 13/16, 1 1/8, 2 5/16, 2, 1 1/8, 1 1/16, 15/16, 1 3/16, 1, 2 3/16, 2 3/8, 2 3/4, 2 5/8, 1, 2 5/8, 2, 1 13/16, 11/16, 3/4, 2 1/2, 2 15/16, 2 15/16, 13/16, 1/2, 1/2, 1 1/2, 2 3/16, 7/8, 1 1/8, 1 7/16, 2 13/16, 1, 1 7/8, 2 1/16, 1 7/8, 2 3/4, 7/8, 2 5/8, 3/4, 1 3/4, $, 2 3/16, 1 3/4, 2 3/8, 1 1/4, 2 1/16, 1 1/4, 13/16, 3/4, 1 9/16, 7/16, 1 5/8, 2 3/4, 2 7/8, 1 1/2, 1 1/2, 3/4, 1/2, 1/2, 2 11/16, 1 1/2, 2 5/16, 3/4, 1 1/8, 9/16, 2 5/8, 2 3/16, 1. The tining device shall place the tines at a skew of 1:6 left hand forward. The groove will be from 1/16" to 1/8" in depth. The texturing equipment shall be self-propelled and mechanically operated.

550.04 CONSTRUCTION REQUIREMENTS. **Page 221** **02-18-00**

Delete the first, second and third paragraphs of Section 550.04 Q.4 and insert the following:

4. **Reinforcing Steel Placement.** The tie bars final position shall be within the following tolerances:
   Vertical Placement ± 1"
   Transverse Placement ± 3"

Delete the last two sentences of the fourth paragraph of Section 550.04 Q.4 and insert the following:

When the average vertical location of the reinforcement is one inch or more outside the specified tolerance or the reinforcement is less than two inches from the top or bottom of the pavement slab, a determination of serviceability will be made according to Section 105.07.

560.04 CONSTRUCTION REQUIREMENTS. **Page 225** **04-17-98**

Delete paragraph four in Section 560.04 C. and insert the following:

Before removing the pavement, all bituminous patching material and joint material shall be removed and disposed of by the Contractor at locations acceptable to the Engineer.

602.03 CONSTRUCTION REQUIREMENTS. **Page 248** **02-19-99**

Change the title of Section 602.03 H.2. to **Expansion Joints**.

612.03 CONSTRUCTION REQUIREMENTS. **Page 258** **05-15-98**

Add the following to the end of the first paragraph in Section 612.03 E.:

If the bars are exposed to ultraviolet rays when storage on the job site or storage yard exceeds, or is expected to exceed, 60 calendar days, the bars shall be covered with opaque polyethylene or other suitable protective material. Provisions shall be made for adequate ventilation to prevent condensation under the covering.

616.03 CONSTRUCTION REQUIREMENTS. **Page 260** **06-19-98**

In Section 616.03 B. insert the following before the first paragraph:

Shop inspection personnel shall meet the qualifications stated in the latest ANSI/AASHTO/AWS D1.5 Bridge Welding Code regarding inspection personnel qualifications.

616.03 CONSTRUCTION REQUIREMENTS. **Page 265** **09-18-98**

Add the following to the end of the first paragraph in Section 616.03 D.:

Flange-to-web welds and shop welded splices in flanges or webs shall be performed using the automatic submerged arc welding process.

616.03 CONSTRUCTION REQUIREMENTS. **Page 266** **02-15-02**

Delete Section 616.03 D.1 in its entirety and insert the following:

1. **Qualifications of Welders, Welding Operators, and Tackers.** As specified in Section 105.06 D. for all welding applications.

616.03 CONSTRUCTION REQUIREMENTS. **Page 266** **04-17-98**
07-17-98

Delete the first two paragraphs in Section 616.03 D.3. and insert the following:

All nondestructive testing (NDT) of welds required by the ANSI/AASHTO/AWS D1.5 95 Bridge Welding Code and by Sections 616.03 D.4 and 616.03 D.5 of the North Dakota Department of Transportation Standard Specifications, shall be the responsibility of the Contractor.

Performance of NDT shall be done by trained personnel under the observation of the Engineer. The trained personnel shall have a minimum qualification as an American Society for Nondestructive Testing (ASNT) NDT Level II operator and two-years experience at that level. A written report of all NDT shall be submitted to the Engineer along with material certification documenting compliance of the welds with contract requirements.

The cost of all NDT shall be included in the bid price for “Structural Steel.”

704.01 DESCRIPTION. **Page 322** **04-20-01**

Add the following to the end of the second paragraph of Section 704.01:

All Category II Traffic Control Devices purchased after October 1, 2000, shall meet the requirements of NCHRP Report 350. There will be a 5-year limit for Category II Traffic Control Devices that do not meet NCHRP Report 350 and purchased before the October 1, 2000, date.

704.02 MATERIALS AND EQUIPMENT. **Page 322** **09-18-98**

Delete Section 704.02 B. and insert the following:

B. **Reflective Sheeting.** Orange diamond-shaped, rectangular, and square signs shall be faced with Wide Angle Prismatic Fluorescent Retroreflective Sheeting meeting Section 894.02 G. Barricades and vertical panels shall be Wide Angle Prismatic Retroreflective Sheeting meeting Section 894.02 F. Flexible reflective sheeting, Type III C, shall be used on drums, cones, flexible delineators, and tubular markers. All remaining signs and sign backgrounds shall be faced with Wide Angle Prismatic Retroreflective Sheeting meeting Section 894.02 F.

704.02 MATERIALS AND EQUIPMENT. **Page 323** **07-16-99**

Delete the second to the last sentence of Section 704.02 F. and insert the following:

The reflectorized stripes shall be fabricated from Type III C, Type IV or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02.

704.02 MATERIALS AND EQUIPMENT. **Page 323** **07-16-99**

Add the following sentence to the end of Section 704.02 G.

The reflectorized band shall be fabricated from Type III C, Type IV or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02.

704.02 MATERIALS AND EQUIPMENT. **Page 323** **09-18-98**
07-16-99

Delete Section 704.02 H. and insert the following:

H. **Tubular Markers and Flexible Delineators.** These devices shall be used to channelize traffic.

1. **Tubular Markers.** Tubular markers shall meet the dimensions, color configuration, and installation details as shown on the Standard Drawings.
2. **Flexible Delineators.** The post shall be tough, resilient PVC in orange color. The post shall have 4-inch wide white bands as shown on the plans. The reflective intensity of the bands shall meet the requirements of Type III C, Type IV, or Wide Angle Prismatic flexible reflective sheeting as provided in Section 894.02

704.02 MATERIALS AND EQUIPMENT. **Page 323** **02-09-01**

Delete Section 704.02 K in its entirety and replace with the following:

K. **Portable Barriers.** Precast Concrete Med. Barriers shall meet the details on the Plans or Standard Drawings. Any barriers manufactured after October 1, 2000, must meet the requirements of *NCHRP Report 350*. Continuing use of barriers, purchased and used on previous NDDOT contracts, are approved throughout their useful life.

704.02 MATERIALS AND EQUIPMENT. **Page 324** **04-23-99**

Delete Section 704.02 O. in its entirety and insert the following:

Short Term Construction Zone Marking and Short Term Pavement Marking. The short term construction zone marking and the short term pavement marking shall meet Section 762.

704.03 CONSTRUCTION REQUIREMENTS. **Page 325** **03-17-00**
04-20-01

Delete the third paragraph of Section 704.03 A. in its entirety and insert the following:

The Contractor is responsible for providing the required traffic control to ensure public and worker safety. If the Contractor has not furnished, installed, located, maintained or removed one or more traffic control devices as required, the Engineer may:

1. Apply a contract price reduction of $300 per day if deficiencies are not corrected within a 24 hour period after notification.
2. Without notification, have the deficiencies corrected by another contractor and deduct the cost of the work from monies due or to become due the Contractor.
3. Direct work to cease until the deficiencies have been corrected.

704.03 CONSTRUCTION REQUIREMENTS. Page 325 02-18-00

Add the following sentence to the end of the fourth paragraph of Section 704.03 A:

Construction sign bases without attached signs shall be marked so they are visible.

704.03 CONSTRUCTION REQUIREMENTS. Page 326 02-18-00

Delete the third paragraph of Section 704.03 C. in its entirety and insert the following:

Portable signs shall be used when construction operations in an area are temporary. Temporary operations are those that can generally be completed in 5 days or less. If unforeseen circumstances occur, such as equipment breakdown, rain, subgrade failures, etc., time will not accrue towards the 5-day period.

When portable signs are used, they shall be placed on the shoulder or outside of the traveled lane where they do not pose a hazard to traffic. The portable signs shall be placed in clear view without any sight obstructions to oncoming traffic. When portable signs are not in use, they shall be removed, moved to a minimum of 45 feet from the edge of the traveled lane, or laid down on the inslope. Signs laid on the inslope shall have stand bases constructed so the signs and bases can be placed flat with no portions of the sign or base projecting upward from the inslope more than 6 inches.

704.03 CONSTRUCTION REQUIREMENTS. Page 326 11-16-01

Add the following paragraph to end of Section 704.03 C.

The portable signs support assembly mounted on trailers shall meet the requirements as specified above for portable signs except as follows. The portable signs mounted on trailers that have passed the crash test required of NCHRP Report 350 as approved by the FHWA shall be used. When portable signs mounted on trailers are not in use, they shall be removed, moved a minimum of 45 feet from the edge of the traveled way, or covered so the sign message cannot be read by approaching vehicles.

704.03 CONSTRUCTION REQUIREMENTS. Page 327 09-18-98

Delete Section 704.03 M. and insert the following:

M. **Flexible Delineator Application.** Flexible delineators used to channelize traffic and separate 2-way traffic shall be located and attached as shown in the Plans. The Contractor shall maintain the delineators until they are removed. The delineators shall be removed as soon as the new roadway is opened to traffic and shall remain the property of the contractor.

If flexible stake delineators are used, the wide side shall face the traffic. If the delineator is to be seen by side traffic, an additional delineator shall have the wide side placed facing the side traffic. The side traffic delineators shall not be paid for, but shall be incidental to the price bid for “Flexible Delineators.”

704.03 CONSTRUCTION REQUIREMENTS. Page 329 04-23-99

Delete the word “temporary” in the first, second, and third sentences of 704.03 T. and insert “short term.”

704.03 CONSTRUCTION REQUIREMENTS. Page 330 04-17-98

Delete Section 704.03 U.1.b.2 in its entirety and insert the following:

(2) Be on site daily to supervise the installation, operation, inspection, maintenance, and removal of the traffic control system.

704.03 CONSTRUCTION REQUIREMENTS. **Page 330** **03-28-02**

Delete the first paragraph of Section 704.03 U.1.c. in its entirety and insert the following:

c. **Traffic Control Course**. The course prescribed in Section 704.03 U.1.a(1) above shall be the American Traffic Safety Service Association (ATSSA) 16-hour Traffic Control Supervisor Course, American General Contractor (AGC) 16-hour Traffic Control Supervisor Course, or the 20-hour National Highway Institute (NHI) Course 38003, Design and Operation of Work Zone Traffic Control, or equal.

704.03 CONSTRUCTION REQUIREMENTS. **Page 330** **04-17-98**
05-15-98

Delete the first paragraph of Section 704.03 U.2 in its entirety and insert the following:

2. **Watchpersons.** Watchpersons shall be provided to patrol the project to assure that the traffic control devices are properly placed in accordance with the traffic control plans and standards. The project shall be patrolled at least twice daily, once in the morning prior to work beginning and once in the evening after work is completed. The project shall also be patrolled twice daily on weekends and days when no work is in progress, once each morning and once each evening before sunset.

704.03 CONSTRUCTION REQUIREMENTS. **Page 332** **10-20-00**
02-09-01

Delete the second paragraph of Section 704.03 X in its entirety and replace with the following:

Each flagger shall be furnished with the booklet, “Flagging Handbook,” and shall observe the rules and regulations contained therein. The Contractor shall obtain copies of the “Flagging Handbook” from the Department.

704.04 METHOD OF MEASUREMENT. **Page 333** **09-18-98**

Add the following to Section 704.04 A.2.:

h. Tubular Markers

704.05 BASIS OF PAYMENT. **Page 334** **09-18-98**
02-09-01
07-20-01

Add the following pay item to Section 704.05 A.:

Pay Item	**Pay Unit**
Tubular Markers	Each
Precast Concrete Med Barrier (state furnished)	Each
Portable Precast Concrete Median Barrier	LF

708.02 SEEDING, SODDING, AND MULCHING. **Page 344** **07-17-98**

Delete the first sentence in Section 708.02 C.1.c.(4) and insert the following:

This seeding type includes placing approved topsoil from borrow areas to form a seed bed.

708.02 SEEDING, SODDING, AND MULCHING. **Page 349** **04-17-98**

Add the following to the beginning of Section 708.02 E.:

Should the quantity of seeding, sodding, or mulching which is part of an approved subcontract decrease by more than 25%, the Contractor may submit a request for an adjustment of the Contract Unit Price. The

adjustment in unit price will only be considered if it justifies an increase in the pro rata share of the fixed costs chargeable to the item because of the decreased quantity. The total payment for the final quantity shall not exceed 75% of the original contract quantity at the Contract Unit Price.

Should the quantity of seeding, sodding, or mulching which is part of an approved subcontract increase by more than 25% from the original contract quantity either party to the contract may submit a request for an adjustment of the Contract Unit Price for the quantity in excess of 125% of the original contract quantity.

The Contractor shall provide a notice of intent to request an adjustment in the Contract Unit Price as soon as the Contractor is aware of overruns or underruns. All adjustments in unit price will be determined according to Section 104.03 B.2. if requested by the Department, the Contractor shall furnish the bid documents used to calculate the Contract Unit Price. Failure to submit the bid documents will result in the Contractor waiving all rights to an adjustment in the Contract Unit Price.

708.03 SOIL RETENTION BLANKET. **Page 349** **07-20-01**

Delete Section 708.03 C.3, and Section 708.03 D.3 in its entirety.

Delete the following of Section 708.03 E;

Pay Item	**Pay Unit**
Fiberglass Roving	Square Yard

709.03 CONSTRUCTION REQUIREMENTS. **Page 356** **09-18-98**
02-18-00

Delete the second paragraph in Section 709.03 A. and insert the following:

The fabric shall be overlapped a minimum of 18 inches at all splices or joints. In lieu of joint overlapping, multiple fabric pieces may be sewed if the seam strength meets the seam strength requirements listed in Section 858.01 A. A 401 stitch conforming to Federal Standard No. 751a shall be used for all seams. Overlapping “J” seams are required for field seams. All seams shall be sewn with two parallel stitch lines spaced approximately 1/4 inch apart. The outside stitch shall be placed approximately one inch from the edge of the fabric. The thread shall be of a material that meets the requirements specified for the fabric.

If sewn seams are going to be used, the Contractor shall also furnish a sewn seam sample, using the same geotextile fabric, thread, seam spacing and number, and overlap distance as are intended or required for use in the work.

709.03 CONSTRUCTION REQUIREMENTS. **Page 356** **11-10-99**
02-18-00

Add the following paragraphs after the second paragraph of Section 709.03 A:

The geotextile fabric and a certification of compliance shall be delivered to the project at least 21 days prior to its incorporation into the work. Fabric shall be approved by the Engineer before installation.

If a fabric is tested and fails, any retests will be at the cost of the Contractor, unless the results of the retest show the fabric passes.

If the Engineer allows installation and the fabric fails to meet the specified requirements a minimum price adjustment of 20% will be assessed to the bid price for any fabric installed. Actual penalties will be determined by the Engineer, based on projected performance of fabric. If the failing fabric jeopardizes the integrity of the project, the fabric will be removed and replaced at the Contractor’s expense.

709.03 CONSTRUCTION REQUIREMENTS. **Page 358** **06-19-98**

Add the following to Section 709.03:

F. **Shipping and Storage.**

Geotextile labelling and identification shall comply to ASTM D 4873–95. If a label is removed during sampling or other reasons, the roll must be relabeled.

Packaging, handling, and storage of geosynthetics shall conform to ASTM D 4873-95 and the following requirements. Each Geotextile roll shall be wrapped with a waterproof cover or membrane for protection during shipping and storage. Geotextiles shall not be exposed to ultraviolet light for more than 14 days and shall be elevated off the ground during storage.

709.03 CONSTRUCTION REQUIREMENTS. **Page 357** **11-21-97**

Delete the first paragraph of Section 709.03 D. in its entirety and insert the following:

If more than one length or width of fabric is necessary, all joints shall be overlapped or sewn as required in Section 709.03 A.

When the fabric is used for scour or stream bank protection it shall be placed loosely and be unrolled in the direction of the anticipated water flow. If the fabric is overlapped, the overlap shall be placed so the upstream strip laps over the downstream strip. The laps along the length of the fabric, parallel to the waters edge, shall be placed so the upper strip overlaps the lower strip. All overlaps shall be pinned or stapled at three-foot intervals.

Fabric used to protect against wave action may be unrolled parallel or perpendicular to the waters edge. The joints or seams of all fabric placed parallel to the waters edge shall be sewn.

709.03 CONSTRUCTION REQUIREMENTS. **Page 358** **09-18-98**

Delete the second and third sentences in the second paragraph of Section 709.03 E.

714.02 MATERIALS. **Page 361** **02-19-99**
03-12-99

Delete the item; Perforated, Corrugated Polyethylene, or Plastic Pipe. 830.03 A.5 in Section 714.02 C. and insert the following:

Item	Section
Perforated, Corrugated Polyethylene, or Plastic Pipe.	830.03 A.4.

714.02 MATERIALS. **Page 361** **02-19-99**
03-12-99

Delete the items; Perforated, Corrugated P.E. Pipe., 830.03 A.5, and PVC Discharge Pipe, 830.03 A.4, in Section 714.02 E. and insert the following:

Item	Section
Perforated, Corrugated P.E. Pipe	830.03 A.4.
PVC Discharge Pipe	830.03 A.3

714.03 CONSTRUCTION REQUIREMENTS. **Page 363** **02-18-00**
04-20-01

Add the following to the end of Section 714.03 A.:

9. Corrugated Polyethylene (plastic) Pipe shall be installed as shown on Standard Drawing D-714-14. A minimum of thirty days after the pipe is installed, the Contractor (under the observation of the engineer) shall

pass a nine point mandrel or other approved object through the pipe to check for deformation. The mandrel diameter shall not be less than 95% of the inside diameter of the pipe. If the plastic pipe has deformed more than 5%, it shall be replaced at the Contractors expense. Another thirty day waiting period will commence upon installation of the replacement pipe.

714.03 CONSTRUCTION REQUIREMENTS. Page 363 05-21-99

Delete the fourth sentence of the second paragraph of 714.03C., and insert the following:

The underdrain shall rest on the filter fabric at the bottom of the trench, at the desired grade, prior to backfilling with the granular fill. No more than 1" of granular material may be used to adjust the pipe to grade.

714.04 METHOD OF MEASUREMENT. Page 365 02-20-98

Delete the first paragraph of Section 714.04 E. in its entirety and insert the following:

E. **Edge Drains**. Edge drains shall be measured by the Linear Foot (parallel to the roadway) of "Edge Drain Permeable Base" or "Edge Drain Non-Permeable Base" installed and accepted by the Engineer. No deduction in length will be made for outlet structures installed along the drain. The Contract Unit Price bid shall include all costs for trenching, geotextile fabric, trench backfill, compaction, caps, manhole connections, and other associated work.

720.03 CONSTRUCTION REQUIREMENTS. Page 367 04-20-01

Delete the first sentence of Section 720.03 B. in its entirety and replace with the following:

B. **Right of Way Markers.** Right or Way markers shall be constructed of Class AE Concrete or recycled Plastic to the dimensions and marking of the markers as shown on the Standard Drawings.

740.03 CONSTRUCTION REQUIREMENTS. Page 376 10-20-00

Move the second, third, fourth, and fifth paragraphs of Section 740.03 C. to Section 740.03 D.

754.03 CONSTRUCTION REQUIREMENTS. Page 387 10-20-00

Delete the first paragraph of Section 754.03 B.2 in its entirety and replace with the following:

2. **Fabrication of Sign Backing.** Sign backing shall be cut to size and shape and shall be free of buckles, warps, dents, cockles, burrs, and all defects resulting from fabrication. Signs that are larger than manufacturer's material shall be fabricated in sections with butt joints vertical. The sections shall have a minimum width of 24 inches. If more than two sections of backing are required, the wide sections shall be placed on the outside positions and the narrower one placed in between. The widest manufacturer's sections of aluminum shall be used before narrower sections are used. The surface of all signs shall be plane surfaces.

Delete the third paragraph of Section 754.03 B.4 in its entirety and replace with the following:

The reflective sheeting used on flat sheet sign backings larger than the manufacturer's material shall have reflective sheeting placed on each section with no vertical or horizontal splicing of the reflective material on the individual panels. All sheeting on each individual sign shall be from the same manufacturer's lot.

Delete the fourth and fifth paragraphs of Section 754.03 B.4 in their entirety.

754.03 CONSTRUCTION REQUIREMENTS. Page 390 02-20-98

Delete Section 754.03 E.4 in its entirety and insert the following:

4. **Single Tubular Sign Supports.** When a single sign support is required, a Single Tubular Sign Support shall be used. Single Tubular Sign Supports shall be set in a Class AE Portland Cement Concrete base,

constructed as shown on the Plans. Breakaway base plates shall be assembled with the bolts torqued to Plan requirements. The plates shall be carefully placed so the tapered bolt slot tapers toward approaching traffic. Either the stub post or the anchor bolt design may be used as detailed. If the anchor bolt design is used, a Portland Cement Grout shall be used to raise the top of the foundation to a snug fit under the base plate.

754.03 CONSTRUCTION REQUIREMENTS. **Page 393** **05-18-01**

Delete Section 754.03 E.6 in its entirety.

754.03 CONSTRUCTION REQUIREMENTS. **Page 394** **02-15-02**

Add the following to Section 754.03 E.7:

d. Welding applications as specified in Section 105.06 D.

754.03 CONSTRUCTION REQUIREMENTS. **Page 390** **03-28-02**

Insert the following after the first sentence of Section 754.03 E.5.a:

Welders as specified in Section 105.06 D.

754.04 METHOD OF MEASUREMENT. **Page 396** **04-14-00**

Delete the second paragraph of Section 754.04 B.1 and insert the following:

The post length shall be measured from the top of the post to bottom of post and top of anchor to the bottom of the anchor, as shown on the plans. The sleeves and break away base, if included, will not be measured for payment, but will be considered incidental to the cost of the post.

754.05 BASIS OF PAYMENT. **Page 397** **02-20-98**
10-20-00

Delete the item “Galvanized Steel Post (two or more)” and “Reset Signs” from the pay item list and insert the following:

Pay Item	**Pay Unit**
Reset Sign Panels	Each
____”Galvanized Steel Post – W-Shaped (two or more)	Linear Foot

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762.02 MATERIALS. **Page 398** **02-20-98**
04-23-99
02-15-02

Delete item “Temporary Stripe” from the materials list and insert the following:

Item	**Section**
Short-Term Pavement Marking	
Paint	880.08
Tape	880.08

762.03 EQUIPMENT. **Page 398** **04-17-98**
06-19-98

Add the following to Section 762.03

Grooving Equipment. The grooving equipment shall utilize diamond blades mounted on a self propelled machine designed for grinding a recess into the pavement surface. The diamond blades shall be gang mounted on a floating head with controls capable of providing uniform depth and alignment. The grooving equipment shall be capable of grooving a total width sufficient to install 4-inch wide pavement marking tape in a single pass. The equipment shall not cause strain or damage to the underlying surface of the pavement. Grooving equipment that causes ravels, aggregate fractures, spalling, or disturbance of the joints shall not be permitted.

762.04 CONSTRUCTION REQUIREMENTS. **Page 399** **04-17-98**
06-19-98

Add the following to Section 762.04 B

6. **Grooved Pavement Markings.** When specified in the plans, the pavement surface shall be grooved to make a recess in the pavement surface for the pavement marking film. The groove shall meet the following tolerances:

Depth	40 mils ±5 mils
Width	line width plus 1/2 inch
Length	line length plus 3 inches per end of line
Line End Tapers	3 inches

For messages, the area grooved shall be the same area as the messages. Grooving a rectangular area to contain the message will not be allowed. Grooving shall meet the depth requirements specified above.

After grinding, the grooved slot shall be blown clean to remove any residue and loose materials prior to the installation of the pavement marking. When wet-grinding, the grooved slot shall immediately be pressure washed to remove residue. If necessary, the grooved slot shall be blown clean just ahead of the pavement marking installation. The pavement markings shall be installed on a clean dry surface within 24 hours of the initial grinding. If pavement marking installation does not occur within 24 hours of the initial grinding, the groove shall be sandblasted and blown clean to remove any dirt, oil, loose material, or other contaminate prior to the installation of the pavement marking.

The pavement marking film shall be installed as specified in Section 762.04 D.

762.04 CONSTRUCTION REQUIREMENTS. **Page 400** **04-14-00**

Delete Section 762.04 C.2 in its entirety and insert the following:

2. **Traffic Movement.** Traffic shall be maintained through the work area at all times according to the traffic control plan and Section 704. Flagpersons shall be furnished when required.

   PROTECTION VEHICLE WITH TRUCK MOUNTED ATTENUATION DEVICE (TMA):

   A protection (shadow) vehicle with a truck mounted attenuation device shall be provided by the contractor to protect personnel and equipment from damage during mobile operations. The protection (shadow) vehicle will not be required on construction projects when the advance warning signs are in place.

   Truck-mounted attenuation device shall meet the test requirements of (NCHRP) Report 350 test level TL-3.

   The protection vehicle equipped with the TMA shall have a minimum weight of 10,000 pounds or the minimum weight recommended by the manufacturer of the TMA.

   The protection vehicle shall be equipped with seat and shoulder belts along with a head cushion.

   The protection vehicle shall have an advance warning flashing or sequencing arrow panel conforming to NDDOT Specification 704.02M.

   The positioning of the protection vehicle with the TMA in relation to construction activities will be as shown in the plans.

The cost of furnishing the protection vehicle with the TMA shall not be bid separately, but shall be included in the price bid for the item “Pavement Markings.”

762.04 CONSTRUCTION REQUIREMENTS. **Page 401** **04-17-98**

After the first paragraph in Section 762.04 D.1.d. add the following:

On the final lift, new asphalt pavements shall be allowed to cool to a maximum temperature of 125°F. before applying short-term pavement marking paint.

762.05 METHOD OF MEASUREMENT. **Page 404** **04-17-98**
06-19-98

Add the following to Section 762.05:

F. **Grooved Pavement Markings.**

1. **Preformed Patterned Pavement Marking – __ inch line (Grooved).** Preformed Patterned Pavement Marking – __ inch line (Grooved) will be measured by the linear foot of the various widths of line installed and accepted by the Engineer.
2. **Preformed Patterned Pavement Marking – Message (Grooved).** Preformed Patterned Pavement Marking —Message (Grooved) will be measured by the square footage of pavement marking message installed and accepted by the Engineer.

762.06 BASIS OF PAYMENT. **Page 405** **04-17-98**
05-15-98
02-15-02

Add the following Pay Items and Pay Units to 762.06:

Pay Item	**Pay Unit**
Preformed Patterned Pavement Marking – __ inch line (Grooved)	Linear Foot
Preformed Patterned Pavement Marking – Message (Grooved)	Square Foot
Preformed Plastic – __ inch line	Linear Foot

764.03 CONSTRUCTION REQUIREMENTS. **Page 408** **11-20-98**
09-17-99

Add the following paragraph to Section 764.03 C:

A manufacturer’s representative shall be available, on an as need basis, for the installation of the guardrail end treatments. The contractor shall furnish 3 copies of the installation instructions and drawings of the guardrail end terminals to the District Engineer. One copy is for the Project Engineer, 1 copy is for the District Engineer, and 1 copy is for the Traffic Control Engineer. The detailed drawings shall contain all components of the end treatment assembly.

764.03 CONSTRUCTION REQUIREMENTS. **Page 409** **02-18-00**
04-20-01

Add the following Section as Section 764.03 I.:

I. **Attenuating Crash Cushions:** The attenuating crash cushion shall be installed in the locations shown on the plans. The attenuating crash cushion shall consist of energy-absorbing material surrounded by a framework of steel, panels, and a nose cover fabricated from plastic or other material with a yellow color. Also concrete slab and anchorage units. The unit shall be able to withstand the environment extremes in the state of North Dakota and operate as specified in this environment.

The units shall have been crash tested in accordance with NCHRP Report 350, Test Level 2 or 3, and approved by the FHWA in writing. The FHWA approval letter shall be provided to the Construction Office with the attenuating crash cushion shop drawings.

The nominal width of the system shall be as shown on the plans. The unit shall be installed in accordance with the manufacturer's recommendation. A Class AAE-3 reinforced concrete slab shall be constructed for each unit as recommended by the manufacturer. All anchorage requirements for the unit to concrete slab shall be installed in accordance with the manufacturer's recommendations. Transition panels shall be installed from the unit to the barrier end or transition as shown on the plans. The contractor shall furnish shop drawings for approval for the attenuating crash cushion. The shop drawings shall include manufacturer's specifications, erection instructions, maintenance instructions, and the FHWA approval letter.

764.04 METHOD OF MEASUREMENT. **Page 409** **11-20-98**

Add the following as Section 764.04 G:

G. **W-Beam Guardrail End Terminal.** W-Beam Guardrail End Terminals will be measured by the unit for each unit installed and accepted by the Engineer.

764.04 METHOD OF MEASUREMENT. **Page 409** **02-18-00**

Add the following Section as Section 764.04 H.

H. **Attenuating Crash Cushion.** Measurement will be by the number of complete units installed and accepted by the Engineer.

764.05 BASIS OF PAYMENT. **Page 410** **11-20-98**

Add the following pay item to Section 764.05:

Pay Item	**Pay Unit**
W-Beam Guardrail End Terminal	Each

764.05 BASIS OF PAYMENT. **Page 410** **02-18-00**

Add the following Pay Item to Section 764.05:

Pay Item	**Pay Unit**
Attenuating Crash Cushion	Each

772.02 MATERIALS. **Page 18, Vol. 2** **02-15-02**

Delete the second paragraph of Section 772.02 in its entirety and insert the following:

The word and phrase definitions shall be as defined in Section 1 "Definitions" of the National Electrical Manufacturer's Association (NEMA) Standard Publication No. TS 2 Traffic Control Assemblies with NTCIP Requirements.

772.02 MATERIALS. **Page 20, Vol. 2** **02-09-01**

Add the following to Section 772.02 C:

The Contractor shall provide a certification that all components of the LED signal modules meet the Institute of Transportation Engineers Standards.

772.03 CONSTRUCTION REQUIREMENTS. **Page 22, Vol. 2** **07-16-99**

Add the following to Section 772.03 D.3:

d. Microloop Probe set shall consist of furnishing and installing the microloop probes at the locations shown in the plans.

e. Preformed Loop Detector shall be securely tied down to prevent the loop from floating during placing of concrete. The pull box end or the conduit shall be sealed to protect against water entrenchment.

772.03 CONSTRUCTION REQUIREMENTS. **Page 27, Vol.2** **02-15-02**

Delete the last sentence of the first paragraph and the second paragraph of Section 772.03 M. and replace with the following:

The cabinet shall be mounted as shown on the plans. The Interface Standards Type 1 or Type 2 shall be as shown on the plans.

The cabinets set directly on concrete foundations shall be set on a sealant and sealed with caulking inside and outside of the concrete base.

772.04 METHOD OF MEASUREMENT. **Page 31, Vol. 2** **02-15-02**

Delete Section 772.04 B.8 in its entirely and insert the following:

8. **Controller.** This item, for Controller Type 1 or Controller Type 2, shall include the cabinet, internal wiring, and other necessary equipment required.

772.04 METHOD OF MEASUREMENT. **Page 31, Vol. 2** **07-16-99**

Add the following items to Section 772.04 B.:

16. **Microloop probe.** Microloop (single, double or triple) probes shall be measured by the number of single, double or triple probe sets installed. This item shall include the trench, drilling holes, sand, conduits, saw slot, length of conductor from pull box including additional quantities required in section 772.03 D. 4, and testing loops.

17. **Preformed Loop Detector.** Preformed Loop Detectors will be measured as a unit. This item shall include the conduit and length of conductor including additional quantities required in section 772.03 D.4.

772.05 BASIS OF PAYMENT. **Page 32, Vol. 2.** **07-16-99**
02-15-02

Add the following pay items to Section 772.05:

Pay Item	**Pay Unit**
Microloop (Single) probe	Each
Microloop (Double) probe set	Each
Microloop (Triple) probe set	Each
Performed Loop Detector	Each
Controller Type 1	Each
Controller Type 2	Each

802.01 DESCRIPTION. **Page 428** **02-20-98**

Delete the first sentence in the first paragraph of Section 802.01 B.3 and insert the following:

Section 816.02 A. divides coarse aggregate into three size numbers based on gradation.

802.01 DESCRIPTION. **Page 429** **02-09-01**
03-16-01

Delete the first paragraph of Section 802.01 C6 in its entirety and replace with the following:

Fly ash replacement of cement is allowed on a 1:1 ratio, up to a maximum of 30% by weight.

806.02 EPOXY RESIN ADHESIVES. **Page 435** **02-19-99**

Delete Section 806.02 in its entirety and insert the following:

This material shall meet AASHTO M-235 Type IV Grade III.

816.03 AGGREGATES FOR SURFACING, BASE, ASPHALT MIXES, BLOTTER, AND SEAL COATS. **Page 440** **11-16-01**

Delete Table I in Section 816.03 B. and insert the following:

Table I: Aggregates for Subgrade Repair, Trench Backfill, Bases, and Surfacing

Sieve Size Percent Passing	Permeable Trench Backfill	Aggr. for Subgrade Repair	Aggr. for Blended Base	Shldr. Aggr. Surface	Aggr. Base	Permeable Base Aggr.	Temp. Traffic Surface Aggr.	Aggr. Surface
	2	3	3M	4	5	7	8	13
3”		100						
1–1/2”							100	
1–1/4”								
1”			100		100	100		100
3/4”	100			100	90–100	95–100		70–100
5/8”								
1/2”						85–100		
3/8”	50–95					60–90		
No. 4		35–85	35–85	35–85	35–70	15–25	35–80	38–75
No. 8						2–10		22–62
No. 10	0–15							
No. 16								
No. 30	0–4	20–50	20–50	10–50	16–40			12–45
No. 50								
No. 100								
No. 200		0–15	4–10	7–17	4–10	0–3		7–15
Shale[1]		12%	12%	15%	12%	8%	20%	12%
L.A. Abrasion[1]				50%	50%	40%		50%
Plasticity Index[2]								
Fractured Faces[3]				10%	10%	85%		10%

816.03 AGGREGATES FOR SURFACING, BASE, ASPHALT MIXES, BLOTTER, AND SEAL COATS. **Page 441** **03-20-98**
02-19-99
11-10-99
02-18-00

Delete Table II in Section 816.03 B. and insert the following:

Table II: Aggregates for Asphalt Mixes, Blotter, and Seal Coats

Sieve Size Percent Passing	Asphalt Hot Mix Low to High Quality				Chip Seal	Chip Seal	Blotter Sand	Sand Seal
	27	29	31	33	42	43	44	45
3”								
1–1/2”								
1–1/4”								
1”								
3/4”								
5/8”	100	100	100	100			100	
1/2”	70–100	70–100	70–100	70–100				
3/8”					100	100		100

No. 4	40–70	40–70	40–70	40–70	20–70	20–70	90–100	85–100
No. 8					2–20	0–17		
No. 16								45–80
No. 30	15–35	15–35	15–35	15–35				
No. 50								10–30
No. 200	2.0–9.0	2.0–9.0	2.0–9.0	2.0–9.0	0–5	0–2	0–20	0–3
Shale[1]	5.0%	5.0%	5.0%	5.0%	8.0%	8.0%		3.0%
L.A. Abrasion[1]	40%	40%	40%	40%	40%	40%		
Plasticity Index[2]	3	3	N.P.	N.P.				
Fractured Faces[3]	55%	65%	75%	95%				
Crushed Fines[4]	10%	40%	60%	80%				

Footnotes for Tables I and II:

[1] Maximum Allowable Percentages.

[2] Maximum allowable unless range shown. N.P. = Non Plastic as per AASHTO T-90. Use material passing the No. 40 sieve (standard method). For Class 5 aggregate the maximum allowable Plasticity Index shall be determined from the following formula: Max. allowable PI for Class 5 = 10 - (% Passing No. 40 Sieve / 10)

[3] Minimum weight percentage allowable for the portion of the aggregate retained on a No. 4 sieve having at least 1 fractured face for Classes 4, 5, 13, 27, 29, 31, and 33, and at least 2 fractured faces for Class 7.

[4] Minimum percentage of material passing a No. 4 sieve that is composed of fractured material produced by a crushing process. The Contractor shall demonstrate that the crushing operation produces this result.

816.03 AGGREGATE FOR SURFACING, BASE, ASPHALT MIXES, BLOTTER, AND SEAL COATS. **Page 442** **11-21-97**

Delete the first footnote in Section 816.03 C. and insert the following:

* Oven-dry weights will be substituted for saturated surface-dry weights. The No. 30 sieve will be substituted for the No. 50 sieve. The percentage of lightweight pieces will be based on the total sample retained on the No. 30 sieve. Lightweight pieces will be those with a specific gravity less than 1.95. Agitate the sample by stirring for a period of 15 seconds. Allow the sample to settle for 30 seconds and decant. Perform this procedure until the specimen is free of floating pieces or a maximum of three times.

818.02 SPECIFIC REQUIREMENTS. **Page 443** **09-18-98**

Add the following to Section 818.02 A.:

3. Performance Graded (PG) Asphalt Cement . . . . . AASHTO MP1*

* Testing Tolerances will be allowed according to Table 1 of the *NDDOT Procedure for Acceptance of Performance Graded Bituminous Material*. The *NDDOT Procedure for Acceptance of Performance Graded Bituminous Material* is on file at the Materials and Research laboratory.

818.02 SPECIFIC REQUIREMENTS. **Page 445** **03-21-99**

Delete the reference “ASTM D977,” in Section 818.02 E. and insert the following reference:

E Anionic Emulsified Asphalt . . . . . AASHTO M-140

818.02 SPECIFIC REQUIREMENTS. **Page 446** **06-18-99**

Delete the table in Section 818.02 E. (notes following the table will remain) and insert the following table:

Property	**ASTM Test**	**HFMS-2**	**HFRS 2P**	**HFRS-2**
Viscosity, Sabolt Furol @ 122°F. (50 °C)	Note #1	35-150	50-200	50-200
Sieve Test, Retained on #20, max. %	Note #1	0.1	0.1	0.1
Storage Stability, 24 hour, max. %	Note #1	1.0	1.0	1.0
Asphalt Residue by Distillation, min. %	Note #2	62	65	63
Oil Portion of Distillate by volume, max. %	D-244	3.0	3.0	3.0
Float Test @ 140°F., Seconds, min.	Note #3	1200	1200	1200
Solubility in Trichlorethylene, min. %	D-4	97.5	97.5	97.5
Penetration, 77°F., 100 gm, 5 sec.	D-5	140–225	140-225	140-225
Apparent Viscosity @ 140°F.	D-4957	Note #4		Note #4
Demulsibility, 0.02 N $CaCl_2$, min. %	D-244		40	40
Demulsibility, 0.1 N $CaCl_2$, min. %		30		
Ductility, 77°F., 5 cm/min., cm, min.	AASHTO T-51		75	40
Elastic Recovery, 77°F., min. %	Note #5		58	

820.01 GENERAL. **Page 448** **04-23-99**

Delete the first full paragraph in Section 820.01 in its entirety and insert the following:

The requirement for loss on ignition in AASHTO M-295 (table 1 chemical requirements) is modified from 5.0% to 2.0% max. Also the optional requirements in Table 1A are required.

Fly ash shall be from an electrical generating plant using a single coal source. Fly ash produced at plants where the limestone injection process is used for controlling air pollutants will be considered unacceptable for use in Portland Cement Concrete. The Contractor shall provide weather-tight storage facilities for the fly ash either at the source or on the Project site.

826.02 MATERIALS. **Page 452** **02-19-99**
03-12-99
05-21-99
06-18-99

Delete Sections 826.02 A.1., 826.02 A.3., and 826.02 A.4. in their entirety and insert the following:

A **Hot Applied Joint Sealant**.

1. **Type 1** . . . . . Crumb-Rubber Joint Sealant.

   The joint sealant material shall be a single component, hot-poured sealant meeting the requirements of AASHTO M-173 and shall have a minimum softening point of 190°F. (88°C.), as determined by ASTM D 36. The sealant shall resist softening and pickup by vehicle tires in the summer and cracking in the winter when used in this application. Plasticizers and fillers may be added as necessary to meet the requirements specified.

   The sealant shall consist of a blend of asphalt cement and vulcanized granulated crumb tire rubber. The asphalt cement shall meet the requirements of AASHTO M-20 or M-226. The minimum percentage of crumb tire rubber added shall be 12% of the total weight of the sealant-rubber mixture.

   The granulated crumb tire rubber shall be free of fabric, wire, cord, and other foreign material. Calcium carbonate may be added at a rate not to exceed 4% of the total weight of the crumb rubber to prevent the rubber particles from sticking together. The granulated crumb rubber shall meet the following requirements:

   a. **Gradation.**

Sieve Size	Percent Passing
#8	100
#10	95 – 100
#30	0 – 20
#50	0 – 5

   b. Specific Gravity of 1.15 ± 0.02

   Acceptance. Joint Sealants that meet the quality requirements specified will be accepted at the contract unit price. Sealants that fail to meet the requirements specified but the quality deviation is not serious enough to materially affect the work quality will be paid for as follow:

   Price Reduction Criteria. Reduce payment for the crumb rubber joint sealer by 20 percent if the Bond or Flow fails.

   The payment for Penetration is reduced by the following schedule. Use the average of the original and check sample to determine the percentage of variation.

Variation of Penetration	Deduct Factor
0.1–5%	5%
5.1–10%	10%
10.1–15%	15%
> 15%	20%

The payment for Softening Point is reduced by the following schedule. Use the average of the original and check sample to determine the temperature variation.

Temperature Variation (Degrees C)	Deduct Factor
85–87.9	5%
80–84.9	10%
< 80	20%

826.02 MATERIALS. **Page 452** **03-20-98**
05-21-99

Change the Penetration at 77°F. requirement in Section 826.02 A.2. from 90–150 to 120–150.

Insert the following:

Acceptance. Joint Sealants that meet the quality requirements specified will be accepted at the contract unit price. Sealants that fail to meet the requirements specified but the quality deviation is not serious enough to materially affect the work quality will be paid for as follow:

Price Reduction Criteria. Reduce payment for the crack sealer by 20 percent if the Bond or Flow fails.

The payment for Penetration is reduced by the following schedule. Use the average of the original and check sample to determine the percentage of variation.

Variation of Penetration	Deduct Factor
0.1–5%	5%
5.1–10%	10%
10.1–15%	15%
> 15%	20%

826.02 MATERIALS. **Page 454** **09-17-99**

Delete the last paragraph of Section 826.02 B.1. and insert the following:

Backer rod shall be a “Type 1” rod material intended for use with cold-applied sealants in accordance with ASTM D 5249 – 95. The width of the backer rod shall be as recommended by the manufacturer for the required saw cut width. No bond or reaction shall occur between the rod and the sealant.

836.04 DOWEL BARS AND TIE BARS FOR PAVEMENT JOINTS. **Page 463** **06-18-99**
07-16-99
09-17-99

Delete the third and last paragraph of Section 836.04, and insert the following:

All dowels shall be Epoxy coated in accordance with AASHTO M 284/M 284M-95. Freshly exposed steel as a result of shearing, saw-cutting, or cutting by other means during the fabrication process is acceptable on the ends of tie or dowel bars used in pavement joints.

Tie bars for the centerline joint in Portland Cement Concrete pavement shall be epoxy coated, meeting the requirements in 836.02 B. Other tie bars not used for the centerline joint shall meet AASHTO M-31, Grade 40 deformed.

840.01 STEEL PILING. **Page 463** **07-20-01**

Delete Section 840.01 A. in its entirety and replace with the following:

A. Steel H-Piling and Special Sections. Materials for steel piling and special sections shall meet AASHTO M-270 Grade 36.

856.05 FIBERGLASS ROVING. **Page 468** **07-20-01**

Delete Section 856.05 in its entirety.

858.01 GENERAL. **Page 469** **09-18-98**

Add the following rows to the table in Section 858.01 A.:

				GEOTEXTILE FABRIC TYPE						
Geotextile Property	Test Method	Separation[2]		Drains				Riprap	Reinforcement	
		S1	S2	D1	D2	D3[3]	D4[3]	RR	R1	R2[4]
Sewn-Seam Strength, lbs.	ASTM D-4632	160	160	160	70	90	N/A	180	N/A	–
Sewn-Seam Strength, lbs./in.	ASTM D-4884	N/A	N/A	N/A	N/A	N/A	N/A	N/A	240	–

Change the Geotextile Property “Ultraviolet Degradation % min. @ 150 Hrs., min.” in the table in Section 858.01 to:

U.V. Resistance
(After 150 hours)
% strength retained

860.03 STEEL POSTS. **Page 470** **05-15-98**

Delete Section 860.03 A. and insert the following:

A. **Line Posts.** Line posts shall meet the details shown on the Plans and the following requirements:

Posts shall be galvanized and meet ASTM A-702, type B steel.

Wire fasteners shall be furnished with each post. They shall be made of galvanized wire and shall securely fasten the wire to the posts.

Each post shall have rolled in corrugations, ribs, lugs or notches so constructed as to engage the fence wires in proper position. Posts with punched tabs intended to be crimped around the wires shall not be accepted.

862.03 GUARDRAIL UNITS AND FITTINGS FOR W-BEAM GUARDRAIL. **Page 473** **11-20-98 02-15-02 03-28-02**

Add the following as Section 862.03 E:

E. **W-Beam Guardrail End Treatments.** W- Beam Guardrail End Treatments shall meet the requirements of the National Cooperative Highway Research Program (NCHRP) Report 350, Test Level 3. The W-Beam Guardrail End Treatments shall be one of the types shown in the Plans.

The impact head shall be capable of flattening, cutting, kinking or bending the guardrail away from the impacting vehicle. The impact head shall be attached as specified by the supplier. A breakaway cable assembly shall be anchored to the guardrail as shown in the plans. The remaining posts shall be break away posts and standard line posts as shown in the plans. The guardrail elements shall be of the lengths shown on the plans and be 12 gage sections as specified in AASHTO M-180. The timber posts shall meet requirements for materials that passed the crash testing.

880.01 PAVEMENT MARKING PAINT. **Page 475** **06-19-98**

Delete the third sentence in Section 880.01 A.2. and replace it with:

Paint shall be packaged in a container coated with a non-corrosive lining.

880.01 PAVEMENT MARKING PAINT. **Page 475** **05-15-98**

Delete the fourth sentence in Section 880.01 A.2 and insert the following:

The outside coating, for drums containing water based paints, shall be a pastel color.

880.01 PAVEMENT MARKING PAINT. **Page 476** **04-14-00**

Delete Section 880.01 B. in its entirety and insert the following:

B. **Specific Requirements for Solvent Based Traffic Marking Paint.** Solvent based pavement marking paint shall meet the general requirements of AASHTO M-248-86: "Ready Mixed White and Yellow Traffic Paints" except for the following requirements:

AASHTO M-248-86, Section 4.1.2 shall be revised as follows:

ASTM D476 Type I Anatase, or Type II Rutile shall be used.

AASHTO M-248-86, Section 5.2.1, Extracted Pigment Requirements, shall be revised as follows:

The minimum purity requirements for the respective materials shall be as given in Sections 4.1.1 through 4.1.5.

Composition of Solvent Based Paint
White Traffic Paint

Pigment Ingredients (% of Pigment)	**Low VOC Type F**
Titanium Dioxide, Min.(Pure)	17.5
Calcium Carbonate	35.0-40.0
Magnesium Silicate	35.0-43.0
Zinc Oxide, Min.	3.0

Composition of Solvent Based Paint
Yellow Traffic Paint

Pigment Ingredients (% of Pigment)	**Low VOC Type F**
Lead Chromate, Min. (Pure)	16.7
Calcium Carbonate	35.0-40.0
Magnesium Silicate	35.0-43.0

AASHTO M-248-86, Section 5.3 shall be revised as follows:

Composition of Non-Volatile Vehicle
White and Yellow Traffic Paint

Vehicle Ingredients (% by Wt. of Vehicle)	**Acrylic Copolymer Type F**	**Chlorinated Rubber Type F**
Alkyd Resin Solids (±0.5%)	41.14	37.6
Acrylic Copolymer BR-201 or equivalent (±0.5%)	47.25	—
Chlorinated Rubber (±0.5%)	—	37.0
Chlorinated Paraffin (±0.5%)	11.61	25.4

AASHTO M-248-86, Section 5.4 shall be revised as follows:

Quantitative Requirements of White Solvent Based Paint

Characteristics	Low VOC Type F
Titanium Dioxide (as % of Extr. Pigment) (min) (Pure)	17.5
Pigment (%)	49.0–51.0
Total Solids (%) (min)	69.0
Vehicle Solids (%) (min)	38.0
Weight per Gallon (lbs) (min)	11.1
Viscosity (K.U.)	70-85
Fineness of Grind (Hegman) (min)	2.0
Drying Time (Minutes) (max)	10.0
Directional Reflectance, (%) (min)	80
Uncombined Water (%) (max)	1.0
Particles and Skins Retained on 325 Mesh Sieve (%) (max)	1.0
Volatile Organic Content ($^{lb}/_{gal}$) (max)	1.25

Quantitative Requirements of Yellow Solvent Based Paint

Characteristics	Low VOC Type F
Lead Chromate (as % of Extr. Pigment) (min) (Pure)	16.7
Pigment (%)	50.0–52.0
Total Solids (%) (min)	69.5
Vehicle Solids (%) (min)	38.0
Weight per Gallon (lbs) (min)	11.3
Viscosity (K.U.)	70–85
Fineness of Grind (Hegman) (min)	2.0
Drying Time (Minutes) (max)	10.0
Color (to pass Fed. Std.) (Chip #33538)	
Directional Reflectance, (%) (min)	50
Uncombined Water (%) (max)	1.0
Particles and Skins Retained on 325 Mesh Sieve (%) (max)	1.0
Volatile Organic Content ($^{lb}/_{gal}$) (max)	1.25

880.01 PAVEMENT MARKING PAINT. **Page 478** **02-20-98**
04-14-00

Delete the table “Quantitative Requirements of Water Based Paint” in Section 880.01 C. and insert the following:

Quantitative Requirements of Water Based Paint

Characteristics	White	Yellow
Pigment (%)	58–62	57–61
Titanium Dioxide, (%) (min), Pure $Ti0_2$ as % of pigment (Rutile II)	12.20	2.50
Acrylic Emulsion Vehicle Resin solids (%) (min)	43.0	43.0
Total Solids (%) (min)	76.1	75.1
Weight per Gallon (lbs) (min)	13.0	12.7
Fineness of Grind (Hegman) (min)	3.0	3.0

Viscosity (K.U. @ 77°)	80–100	80–100
pH (min)	9.6	9.6
Color (Fed. Std. Chip #33538)		
CIE Chromaticity Limits		x_{10} = 0.470–0.530 y_{10} = 0.429–0.483
Drying Time (Minutes) (max) (ASTM D-711) 12 mil wet thickness @ 77°F.:		
@65%R.H.	12.0	12.0
@90%R.H.	75.0	75.0
Contrast Ratio @ 15 mils wet (%) (min)	98.0	96.0
Directional Reflectance, Daylight (%) (min)	83	39.5
Volatile Organic Content, (lb/gal) (max)	1.25	1.25

880.01 PAVEMENT MARKING PAINT. **Page 479** **03-17-00**

Delete the first paragraph of Section 880.01 C. and insert the following:

The vehicle resin solids shall be composed of a 100% acrylic polymer such as Rohm and Haas E-3427, or equivalent.

880.04 DURABLE PREFORMED PAVEMENT MARKINGS. **Page 484** **04-20-01**

Delete Section 880.04, Durable Preformed Pavement Markings, in its entirety.

880.05 PREFORMED PLASTIC MARKING FILM. **Page 486** **04-20-01**

Delete Section 880.05 C. in its entirety and insert the following:

C. Skid Resistance. The surface of the preformed plastic marking film shall provide an initial skid resistance value of 55 BPN and a retained skid resistance value of 35 BPN when tested according to ASTM E-303.

880.07 REFLECTIVE PRESSURE-SENSITIVE PAVEMENT MARKING SHEETING. **Page 488** **04-20-01**

Delete Section 880.07 Reflective Pressure-Sensitive Pavement Marking Sheeting, in its entirety.

880.08 TEMPORARY STRIPE. **Page 488** **02-20-98**

Delete Section 880.08 in its entirety and insert the following:

880.08 SHORT-TERM PAVEMENT MARKING.

Short-term pavement marking, placed on the top lift of asphalt paving projects and after final brooming on seal coat projects, shall meet Section 880.01. Pavement marking paint for short-term pavement marking, on the lower lifts of asphalt paving projects and before final brooming on seal coat projects, may be commercially-available traffic marking paint, and shall be yellow or white in color.

Mixed commercially-available traffic marking paint shall show no signs of thickening, caking, livering, or curdling, and shall be free of water, skins, and any other foreign materials. At the time of application, the mixed paint shall be capable of being easily stirred with a paddle to a smooth, uniform consistency. The paint shall dry to an elastic, adherent finish that will not discolor in sunlight.

Glass beads for short-term pavement marking shall meet Section 880.02.

Pavement marking tape for short-term pavement marking shall be 4 inches wide with a pressure-sensitive adhesive backing and have reflectorizing glass beads embedded in the surface. The tape shall be durable and function effectively for the required period of service and adhere to the pavement surface.

880.09 CONSTRUCTION ZONE MARKING. **Page 489** **04-20-01**
03-28-02

Delete Section 880.09 A. in its entirely and insert the following:

A. **Type R – Removable Retroreflective Pavement Markings.**

The removable striping tape must be designed and constructed in such a manner that it can be readily removed when the markings are no longer applicable. The tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large pieces manually.

1. **Composition.** The removable preformed retroreflective pavement markings shall consist of glass beads embedded in white or yellow film with a thin flexible conformable backing which is precoated with a pressure sensitive adhesive. A structured interlaced medium shall be incorporated to facilitate removal.

2. **Reflectance.** The white and yellow films shall have the following initial minimum reflectance values at 0.2° and 0.5° observation angles and 86.0° entrance angle as measured in accordance with the testing procedure of ASTM D-4061. The photometric quantity to be measured shall be specific luminance (SL), and shall be expressed as millicandelas per square foot per foot candle. The angular aperture of both the photoreceptor and light projector shall be 6 minutes of arc. The reference center shall be the geometric center of the sample, and the reference axis hall be taken perpendicular to the test sample.

	White			Yellow		
Entrance Angle	86.0°	86.0°	86.5°	86.0°	86.0°	86.5°
Observation Angle	0.2°	0.5°	1.0°	0.2°	0.5°	1.0°
Specific Luminance	1770	1270	750	1310	810	450

3. **Adhesion.** The manufacture shall be required to demonstrate that the properly applied pavement marking adheres to the roadway under climatic and traffic conditions normally encountered in the construction work zone.

4. **Removability.** The marking film shall be removable from asphalt concrete and portland cement intact or in large pieces, either manually or with a roll-up device at temperatures above 40°F without the use of heat, solvents, grinding or blasting.

5. **Skid Resistance.** The surface of the markings provides an initial minimum skid resistance value of 50 BPN when tested according to ASTM E303-74.

894.05 POSTS AND HARDWARE FOR SIGNS. **Page 506** **02-19-99**

Add the following sentence to Section 894.05 B.4.e.:

All metal shall be removed from the punched holes.

894.08 STRUCTURES FOR OVERHEAD SIGNS. **Page 513** **03-28-02**

Add the following to the end of the first sentence of Section 894.08 B.6.:

Steel U-bolts shall be fabricated from round steel bars and threaded on both ends meeting ASTM A-307, and galvanized according to AASHTO M-232.

894.08 STRUCTURES FOR OVERHEAD SIGNS. **Page 513** **02-18-00**

Delete the sixth paragraph of Section 894.08 B.7 and insert the following:

Washers shall conform to ASTM F 436 for circular washers.

Delete the words “Type A” of the first sentence of the seventh paragraph of Section 894.08 B.7.

895.04 PULL BOX. **Page 42, Vol. II** **11-16-01**

Add the following before the first sentence of Section 895.04:

Pull Box’s shall be installed as shown in plans.

Delete the second paragraph of Section 895.04 in its entirety.

895.06 LIGHTING STANDARDS. **Page 43, Vol. 2** **02-15-02**

Delete the first sentence of Section 895.06 A and insert the following:

A. **Design.** Lighting poles shall meet the requirements of AASHTO publication, *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* (1994).

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896 TABLE OF CONTENTS. **Page 38, Vol.2** **02-15-02**
03-28-02

Delete table of contents from 896.12 B to 896.14 C.1 and insert the following:

B. Controllers

896.13 CONTROLLER CABINET

A. Cabinet Design
   1. Cabinet Material
   2. Cabinet Size
   3. Cabinet Style
      a. Cabinet Door
      b. Cabinet Items
         (1) Control Equipment
         (2) Fan Vent
         (3) Duplex Receptacle
         (4) Fused Input for Interconnect Cable
         (5) Maintenance Switches
            (A) Stop Time
            (B) Timer Power
            (C) Flash
            (D) Vehicle Detector Input
            (E) Pedestrian Input
   4. Sockets
   5. Radio Filters and Surge Protection
   6. Additional Load Switches
   7. Test Switch
   8. Circuit Breakers

896.14 CONTROLLER

A. General

1. Hardware
2. Load switches
3. MMU unit
4. Remote Flashing
5. Load Switches For Pedestrian
6. Technician Training

B. Pretimed Controller
1. Controller Requirements
2. Transfer Cycle
3. Time Switches
4. Minimum Controller Features

C. Actuated Controller
1. Controller Standards

896.01 GENERAL. **Page 58, Vol.2** **02-15-02**

Delete the third paragraph of Section 896.01 and insert the following:

The word and phrase definitions shall be as defined in Section 1 “Definitions” of NEMA Standards Publication TS 2 latest edition *Traffic Control Assemblies with NTCIP Requirements*.

896.01 GENERAL. **Page 58, Vol. 2.** **07-17-98**

At the end of Section 896.01 add the following paragraph:

All hardware and software shall process dates and date-related data accurately prior to, during and after the year 2000. This will include accurately inputting, storing, manipulating, comparing, calculating, updating, recording, displaying, outputting and transferring such dates and data.

896.03 CONDUCTORS. **Page 59, Vol. 2.** **07-16-99**

Delete Section 896.03 B.4 in its entirety and insert the following:

Preformed Loop Detector: The Performed Loop Detector shall be constructed of PVC and loop conductor. The loop detector shall be totally encased in 1/2” schedule 40 PVC, (sprinkler pipe, heavy wall construction) with pipe fittings and glue. One corner shall be terminated with a 1/2” PVC tee fitting to provide an exit to the pull box conduit. The PVC is to be sealed at the joints with water pipe fitting glue to prevent water entrenchment. The conductor shall be No. 14 AWG, Type XHHW or THHN or THWN, 600 V stranded single conductor. The loop shall be constructed from a continuous piece of conductor with no splices throughout the entire length to the pull box. Three turns shall be placed in the preformed loop. The conductor from the loop to the pull box shall be twisted to provide a minimum of two to five turns per foot.

896.03 CONDUCTORS. **Page 60, Vol. 2.** **07-16-99**

Add the following paragraph as Section 896.03 B.5:

Microloop Probe: The microloop probe shall be a small, cylindrical, passive transducer of earth’s vertical magnetic field intensity into inductance. It transforms changes in magnetic field intensity into inductance changes which can be sensed by loop detector units. Probes shall fit vertically in 1” holes and lead-in cable in 3/8” saw slot or in sand in the roadway base. Microloop probes can be connected in series with other microloop probes or conventional wire loops. The microloop probe shall operate under the following parameters: Earth’s Vertical Magnetic Field (0.2 to 1.0 oersted), Inductance (20 microhenreis to 25 microhenries per probe plus 20 microhenries per 100’ of wire), DC Resistance (0.5 ohms per probe plus 3.2 ohms per 100’ of wire) Transducer Gain (typically 3.5 microhenries per oersted at 0.4 OE ambient vertical field intensity), and Sensitivity with 2 probes (7.0 microhenries per oersted at 0.4 OE ambient vertical field intensity). The microloop probes shall

operate at a temperature range of –35°F to +165°F (–37°C to +74°C) and at humidity of 0 to 100%. The microloop probes shall detect all motorized vehicles.

896.06 FEED POINTS. **Page 60, Vol. 2** **02-15-02**

Delete Section 896.06 B.4 in its entirety and insert the following:

4. The flasher shall be solid state and meet NEMA Standards Publication No. TS 2, latest edition, Traffic Controller Assemblies with NTCIP Requirements, Section 6.

896.07 TRAFFIC SIGNAL STANDARDS. **Page 61, Vol. 2** **02-15-02**

Delete the first sentence of Section 896.07 A. and insert the following:

A. **General.** The design of Traffic Signal Standards shall meet the requirements of AASHTO publication, *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* (1994).

896.08 TRAFFIC SIGNAL HEADS. **Page 63, Vol. 2.** **02-09-01**
07-20-01

Delete Section 896.08 A1in its entirety and replace with the following:

1. **General**. The design of the signal head shall allow for the addition of a signal section with the aid of simple tools and the addition of certain standard parts. All signal heads, lamps or a light-source using Light Emitting Diodes (LED) shall conform to the latest standards of the Institute of Transportation Engineers. All exposed screws and fasteners shall be 1808, Type 304 stainless steel.

Add to the end of Section 896.08 A3.

The LED signal module shall fit into the traffic signal housing built to the Equipment and Materials Standards of the Institute of Transportation Engineers (ITE).

Add the following to Section 896.08.A

A. The Contractor may choose to furnish signal heads using circular lenses using either incandescent lamps as a light source or a LED light source. He may provide a combination of signal sections using circular lenses using incandescent lamps as the light source and/or LED as a light source.

   The manufacturers shall certify that the ITE specifications are met. These certifications shall be supplied with the shop drawings.

896.10 PEDESTRIAN PUSH BUTTON POST AND BUTTON. **Page 68, Vol. 2.** **04-20-01**

Add the following paragraph to the end of Section 896.10:

The pedestrian push button shall be raised from or flush with their housings and shall be a minimum of 2 inches in the smallest dimension. The force required to activate the push button shall be no greater than 5 lbf.

896.12 LIGHTNING PROTECTION. **Page 70, Vol. 2** **02-15-02**

Delete the heading on Section 896.12 B. and insert the following heading:

B. **Controllers.**

Delete Sections 896.13 and 896.14 in their entirety and insert the following:

896.13 CONTROLLER CABINET.

A. **Cabinet Design.** The control cabinet shall meet the requirements of NEMA TS 2 Traffic Controller Assembly with NTCIP Requirements Section 7, except as follows:

1. The steel cabinet shall be painted with 2 coats of aluminum paint meeting Section 852.01A. Care shall be taken that no gasketing is sealed until the paint is dry. All hinges, lock nuts, and any other moving parts, shall be free and operate easily without damage to the gasketing after paint work is complete. Cabinets that are constructed entirely of aluminum need not be painted.

2. The base mounted cabinet shall be sized to provide space for the housing of all equipment specified as well as future coordination equipment. The minimum dimensions of the cabinet shall be 52 inches high, 44 inches wide, and 24 inches deep.

3. The cabinets shall have a cover to block air flow in cold weather. A metal weatherproof cover shall be provided to adequately cover the fan vent assembly and the louver on the door. The cover shall be gasketed and attached to the inside of the cabinet. The cover shall be of the same material as the cabinet and shall be finished the same as the cabinet.

   a. A weep hole shall be provided in the bottom loop on each end of the cabinet full-size door for water drainage. The cabinet full-size door shall open to the LEFT or RIGHT as shown in the Contract.

   b. The cabinet shall contain, among others as required, the following items:

      (1) All items of control equipment specified in these Specifications.

      (2) A thermostatically-controlled minimum 250 watt strip-type finned heater shall be provided and mounted on the full-size door cover and shall have a protective wire-mesh shield installed around the heater. A heavy-duty thermostat, such as a Penn Central A19-BAB-3 or equal shall be used. Power to the fan and to the heater shall be activated by a 3-position toggle switch located on the auxiliary switch panel. The switch shall operate vertically up and down with the up position being FAN (power to the fan shall be on and power to the heater shall be off); the center position being OFF (power to both the fan and the heater shall be off); and the down position being HEATER (power to the heater shall be on and power to the fan shall be off). An electrical 3-prong twist lock-type plug shall be provided between the switch and the heater so the heater can be easily removed. The heater thermostat shall be mounted on the auxiliary switch panel. Connection to the heater shall be made with stranded copper wire having 200°C. insulation and noninsulated, solderless terminals.

      (3) Duplex receptacle with ground fault interruptor, lamp base with switch. Outlet and lamp to be fused ahead of the main circuit breaker.

      (4) Fused input for interconnect cable complete with MOV surge protection.

      (5) Maintenance switches inside the cabinet shall include the following:

         (a) Stop time control.

         (b) Timer power.

         (c) Flash.

         (d) Vehicle detector input for each phase in use and all future phases.

         (e) Pedestrian input for each phase in use and all future phases.

4. Load switches and flasher with number of sockets as shown in the Contract shall meet the requirements of NEMA TS2 Traffic Controller Assembly with NTCIP Requirements Section 6 and shall include switches and flashers for future phases.

5. Two radio interference filters and surge protectors, each rated at nominal 120 VAC, 60 Hz., and minimum 30 amp or greater based on load, with one filter and surge protector in the main automatic operation circuit and the other in the main flashing operation circuit.

6. In addition to the number of solid-state load switch units required to operate the intersection, one spare solid-state load switch unit, separately packaged and marked, shall be provided and stored in the cabinet.

7. Pushbutton detector test switches shall be provided in the controller cabinet for placing calls for vehicular and pedestrian phases for testing purposes.

8. The cabinet shall contain 2 surface-mounted main circuit breakers with no back wiring. One breaker shall carry the load during automatic operation and the other breaker shall carry the load during flashing operation. The breakers shall be single pole, 120/240 volt, 60 Hz., and 30 maximum ampere based on the load. If the signal circuit load during automatic operation exceeds 30 amperes, a 3–pole common trip circuit breaker with 30 ampere rating for each pole or a single 60 amp breaker shall be used on that circuit. The signal bus load shall be split and equally divided between the 2 poles. If the flash load exceeds 30 amperes, a 30 ampere 2–pole breaker with split flash shall also be used on that circuit. Each circuit breaker shall be clearly marked with “ON” and “OFF” positions and identified with the load which it is carrying (“AUTO” or “FLASH”).

896.14 CONTROLLER.

A. **General.** The controller shall be a solid state unit and shall have front panel access to display cycle length, offset, and internal timing values. Access to these timing functions shall be by keyboard entry as an integral part of the controller. The controller shall meet NEMA environmental and electrical performance standards. The display shall be a liquid crystal display (LCD) and contain a minimum of 4 lines with 40 characters per line. The display shall have a 16 range adjustment of contrast control and backlighted which automatically turns off 10 minutes after the last key is depressed. The display and keyboard shall be functional over the NEMA temperature range of –34°F. to +165°F.

1. Hardware for future pedestrian signals shall be provided when shown.

2. The controller shall be equipped with solid state signal load switching devices meeting current NEMA requirements. Load switches shall be furnished with indicator lights on the front panel.

3. Each controller shall be furnished with a malfunction manager unit (MMU) conforming to NEMA performance standards.

4. The controller shall be furnished with extra feature wiring to provide for remote flashing and each wire shall have its own terminal connection. The flash control circuit shall ensure that remote transfer to flashing from normal stop and go operation occurs during the No. 1 interval in the cycle. When the controller is in flashing condition, the signal switching mechanism shall be inoperative.

5. Load switches for pedestrian indications shall be required when pedestrian indications are shown. The cabinet wiring, load switch sockets, and connection facilities shall be included for pedestrian movements permissible with phasing shown.

6. The Contractor shall provide a technician trained in the operation of the controller to provide training to others at the time of signal activation. The technician shall be available for at least two consecutive days.

B. **Pretimed Controller.**

1. The controller furnished shall meet current NEMA TS 2 Traffic Controller Assemblies with NTCIP Requirements. The plans shall show Type 1 or Type 2 to be used at the intersection.

2. Transfer from one cycle to another shall occur only at the beginning of the first interval in the signal sequence. Indiscriminate transfer anywhere in the first interval shall not be allowed.

3. Time switches shall be solid state and provide control of selected signal functions. Manual switches for selecting normal controller functions shall be provided in the controller cabinet and be of the type compatible with traffic control function requirements. The manual switches shall have skip day capability and battery backup for continuous operations for at least 72 hours during power failure. When the manual switches require mounting to the cabinet wall, they shall be mounted on the inside of the cabinet door.

4. The controller shall have, as a minimum, the follow features:

3 cycle lengths	1 signal plan
2 splits per dial	preempt capability
3 offsets per dial	2 actuated inputs.

C. **Actuated Controller.**

1. The controller furnished shall meet current NEMA TS 2 Traffic Controller Assemblies with NTCIP Requirements. The plans shall show Type 1 or Type 2 to be used at the intersection.

896.15 LOOP DETECTOR AMPLIFIERS. Page 104, Vol. 2. 3-28-02

Delete the first and second paragraphs of Section 896.15 and insert the following:

The loop detector amplifiers specified shall meet NEMA TS 2 Traffic Controller Assemblies with NTCIP Requirements.

896.17 EMERGENCY VEHICLE PRE-EMPTION. Page 107, Vol. 2. 03-28-02

Delete Section 896.17 E. in its entirety and insert the following:

E. **Reliability.** All equipment supplied as part of the optical priority remote traffic control system intended for use in the controller cabinet shall meet the electrical and environmental specifications in the NEMA TS 2 Traffic Controller Assemblies with NTCIP Requirements.
